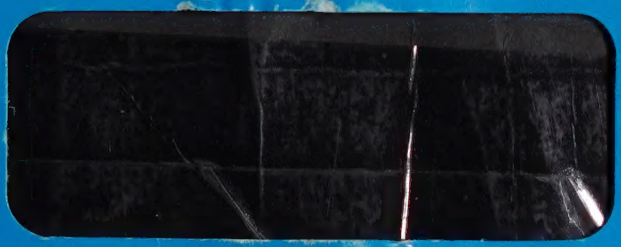

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MANUAL PART NO.
MS30-V8202-00

GOULD SERVICE MANUAL
MODEL 3200 AND 3400
THERMAL WRITING RECORDERS

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Jan., 1988

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INTRODUCTION

This manual contains complete information required to service and repair the Gould RS 3200 and RS 3400 thermal recorders. It is intended to complement the User's Manual, part number MU30-V0202-00 which is supplied with every unit. The separate user's manual contains Sections I, II, III and IV, description, installation, operation and user maintenance, respectively.

This service manual includes a detailed theory of operation, acceptance test, internal calibrations and adjustments, and a complete parts identification section with exploded views. All schematics may be found in Appendix A in the back of this Manual.

Consult the User's Manual for installation and operating instructions, operative and preventive maintenance information, product specifications and other user information.

SECTION I

THEORY OF OPERATION

1.1 INTRODUCTION

All 3000 Series Recorders contain the same or similar modular assemblies. Operational understanding of the various models must be based on the understanding of its basic assemblies. This Theory of Operation is organized to provide assembly level operational descriptions.

Schematics are available in the appendix at the back of this manual.

1.2 CHART DRIVE BOARD 897658

1.2.1 Introduction

The Chart Drive Board (Stepper) is used in all models of the 3000 series to control the stepper motor. Proper operation of this P.C. BD. assembly is necessary for smooth linear paper motion throughout the recorder's operating speeds, .005 mm/sec to 500 mm/sec.

1.2.2 General

The Chart Drive Bd. resides in a dedicated slot of the cardcage, and interfaces to the recorder via the Motherboard backplane connector, J41. It is basically a slave to the Controller Board. The Chart Drive Board controls the stepper motor speed per data loaded into it by the controller. In addition to controlling the stepper motor speed the Chart Dr. Bd. outputs various signals to the system and user to support internal recorder functions and external features.

One of the internal functions of the Chart Drive Bd. is to accept chart drive motion detection signals from the Recorder's optical motion detector, and make a comparison to the programmed chart speed. A "MOTOR STALL" condition can then be detected and displayed to the user via the Controller and Front Panel Display.

Another internal support function is to output signals proportional to chart speed to the thermal Pen Heat Control boards. As the chart speed increases, thermal pen heat increases to maintain high quality thermal writing.

The primary external support function that the Chart Drive Bd. provides is synchronous chart speed operation with an external event or other 3000 Recorder. The user implements this master/slave feature via the "sync in" and "sync out" signals routed through the Controller's Remote connector and Front Panel Keyboard commands.

1.2.3 Description

To accomplish the primary and miscellaneous functions of the Chart Drive, a variety of state of the art circuit techniques are employed. The following discussion breaks the Chart Drive up into functional blocks to help explain it.

Schematic references are made throughout the following discussion. The Chart Drive Board schematic is 297658.

- o uP Interface: The micro-processor interface block includes U1, U2, U3, U4, U5, U6 and U9.

  Together these IC's buffer all signals entering and leaving the Chart Drive Board. By buffering these signals reliable operation in noisy environments is guaranteed.

  The other task of the interface block is to generate and qualify the appropriate individual chip selects. The Controller requires these chip selects to support communication with the speed control DAC, PROGRAMMABLE DIVIDER, rewind latch and external operation latch. These chip selects are generated from the Controller's address bits, Chart Drive select signal (chart), and other bus qualifiers.

- o DAC & VCO: (chart speed control Digital to Analog Converter & Voltage-Controlled Oscillator). This block includes DAC U10, VCO U37 and operational amplifiers U11 & U12.

  The Controller loads the 12 bit Digital to Analog Converter with digital data proportional to the desired stepper motor speed and desired chart speed. The output span of the DAC and its amplifier is 0.0V to -10.0V which corresponds to its digital data zero to 4000 (base 10).

  The output span of the DAC is input to the Voltage-Controlled Oscillator. A logic level pulse train is generated where at -10.0V input, the output frequency is 80,000 Hz. At the minimum frequency generated, -0.1V input, the output frequency is 800 Hz.

  Due to the variations with the VCO, calibration of this block is necessary. VCO output frequency can be measured at Test point -2 with an averaging frequency counter having a 10:1 probe.

  Zero offset is adjusted at the VCO's amplifier using R27. With minimum chart speed data loaded into the DAC, the output frequency of the VCO should be adjusted to average 800.0 Hz. Gain is adjusted by varying the reference voltage feeding the DAC with R43. With maximum chart speed data loaded into the DAC, output frequency of the VCO should be adjusted to average 80,000 Hz. Because the zero offset adjustment cannot be made with an absolute circuit voltage of zero, these adjustments are interactive and may take several iterations to get right on.

1.2.3 Description (cont.)

- PROGRAMMABLE DIVIDER: This block is composed of U13.

  The PROGRAMMABLE DIVIDER accepts the pulse train input by the VCO and divides it by 2, 120, 200 or 2000, depending on data loaded into the Controller. This DIVIDER performs the Recorder's divide-by function initiated by the Front Panel "divide by" key. It is also the means in which the dynamic range of the chart speed, 100,000:1, is attained. The customer selects the divide-by coefficient of 1, 60, 100 and 1000, with DIP switches on the controller. The controller doubles the coefficient to the Chart Drive Board because the minimum available initial coefficient is 2.

- FULL STEP PHASE CONTROL: This block is composed of a 6 bit binary counter, U14, and a phase controller U15.

  Bipolar stepper motors have 2 stator coils, SINE & COSINE MOTOR COILS, and 1 permanent magnet rotor. To force a stepper motor to rotate, a sequence of 4 flux patterns is generated by the coils. This sequence corresponds to the forced rotor movement of 4 full steps. The sequence repeats to provide continuous rotation.

  To generate 4 flux patterns from a stepper motor having only 2 stator coils, current is forced to flow in a positive and negative direction of each coil. This is what is meant by PHASE CONTROL.

  The phase controller IC is a Programmable Array Logic device which is configured to generate current steering signals for a 4 step sequence. This sequence is with respect to the 6 bit, 0 to 63 base ten, binary counter.

  The binary counter is incremented with every pulse that is fed it by the PROGRAMMABLE DIVIDER. The phase controller generates a new full current steering pattern at 16 count intervals of the binary counter.

- uSTEP WAVEFORM GENERATOR: Following the FULL STEP PHASE CONTROL block, the Chart Drives circuitry divides to independently control the SINE & COSINE STEPPER MOTOR COILS. The SINE & COSINE circuitry is nearly identical with the exception that the motor coil currents are forced to be 90 degrees out of phase.

  uSTEP "SINE" WAVEFORM GENERATOR block is composed of operational amplifier U18, ROM look-up table U19, DAC U21 and timing latch U29. uSTEP "COSINE" WAVEFORM GENERATOR block is composed of operation amplifier U18, ROM look-up table U20, DAC U22 and timing latch U30.

1.2.3 Description (cont.)

To get high resolution and smooth linear motion from the stepper motor, micro-stepping technique is utilized. Micro-stepping is the technique which simply forces a stepper motor to rotate in fractions of full step angular rotation. The 3000 Recorders use a stepper motor having 200 full steps per revolution. The Stepper divides each full step into 16 micro-steps, which allows for 3200 increments of rotation per revolution.

Micro-stepping is accomplished by forcing motor coil currents to flow in a sinusoidal fashion. The SINE & COSINE STEPPER MOTOR COIL currents have the trigonometric phase relationship of their names. STEPPER MOTOR COIL currents closely follow in magnitude to the WAVEFORM GENERATOR outputs.

The uSTEP WAVEFORMS are generated with respect to the binary count fed to ROM based look up tables, the ROM table data feeds a timing latch, which in turn feeds digital to analog converter circuitry. The outputting analog voltage feeds subsequent blocks of circuitry.

The analog to digital conversion circuitry on early revision Chart Dr. assemblies require calibration. The gain circuit adjustment for both branches of circuitry is R42. Adjust potentiometer until the DC voltage at U18 pin 8 equals 6.0V. R42 is not present on later revision assemblies.

- PWM CURRENT LIMIT: Pulse Width Modulation CURRENT LIMIT circuitry, independently controlling both sine and cosine branches, is composed of the digital frequency divider U24, set of voltage comparators U33, and set of PWM control latches U26.

  The frequency divider generates a 31,500 Hz square wave from the 1,000,000 Hz "E clock" system signal. The PWM control latches use the 31,500 Hz frequency as a "set" command. When a control latch is "set", the H BRIDGE POWER AMP block is commanded to force current through the appropriate STEPPER MOTOR COIL.

  A control latch is reset with the voltage comparator, receiving inputs from the uStep WAVEFORM GENERATOR block and the CURRENT SENSE FEEDBACK AMP block. When the feedback voltage exceeds the reference voltage, the control latch is reset and the H BRIDGE POWER AMP block is commanded to cease current flow through the appropriate STEPPER MOTOR COIL.

- H BRIDGE POWER AMP: The sine branch POWER AMP consists of NAND gating U28, intermediate totem pole drivers U39, U42 & U43, MOSFET driver set U45 and current re-circulating diodes CR6, CR7, CR8 and CR9. The cosine branch POWER AMP consists of NAND gating U28, intermediate totem pole drivers U40, U42 & U44, MOSFET driver set U46 and current re-circulating diodes CR10, CR11, CR12 and CR13.

1.2 CHART DRIVE BOARD 897658

1.2.3 Description (cont.)

The NAND gating accepts phase control signals from the FULL STEP PHASE CONTROL block and current limit signals from the PWM CURRENT LIMIT block. Per these inputs NAND gating drives the totem pole drivers which in turn drive the MOSFET drivers. The MOSFET's are driven in pairs to control which direction current is forced through the STEPPER MOTOR COILS, and Pulse Width Modulated to limit the current to the desired average level.

Current re-circulating diodes are incorporated in the circuit to steer the decaying STEPPER MOTOR COIL currents during the H BRIDGE off times back into the power supplies. The resulting overall power savings is considerable.

- o CURRENT SENSE FEEDBACK AMP: The sine and cosine branch FEEDBACK AMPS are independently composed of sets of operational amplifiers U35 & U38.

  Power feeding each H BRIDGE POWER AMP block is sensed via a 0.1 ohm resistor, then differentially amplified, then amplitude amplified, then rectified and finally filtered. As previously mentioned, this block feeds the PWM CURRENT LIMIT block.

1.3 MOTHER BOARD 897650, 897651 & 897517

1.3.1 Introduction

This set of mother board assemblies is used in the 3000 recorder product line. These boards act as a backplane to the cardcage portion of the recorders.

The 897650 supports the 2 channel frame size cardcage.
The 897651 supports the 4 channel frame size cardcage.
The 897517 supports the 8 channel frame size cardcage.

1.3.2 General

These boards provide the signal paths and will tie together all of the primary electronic assemblies of the recorder. These boards only pass signals; they are passive assemblies having no active components.

1.3.3 Description

The mother boards in conjunction with the mother-in-law boards tie together all the primary and secondary electronic assemblies of the recorder.

System schematic diagrams and mother schematic diagrams clearly illustrate the who's, what's and where's of all connections.

1.3 MOTHERBOARDS 897650, 897651 & 897517

1.3.3 Description (cont.)

The 2 channel frame size mother schematic is 297650.
The 4 channel frame size mother schematic is 297651.
The 8 channel frame size mother schematic is 297517.

1.4 MOTHER-IN-LAW's, 897811-1, 897812-1 & 897813-1

1.4.1 Introduction

This set of Mother-in-Law (MIL) and assemblies is used in the 3000 recorder product line. These boards act to interconnect most of the electronic assemblies located in the transport half of the recorder.

The 897811-1 supports the 2 channel frame size Transport Assembly.
The 897812-1 supports the 4 channel frame size Transport Assembly.
The 897813-1 supports the 8 channel frame size Transport Assembly.

1.4.2 General

These boards provide a signal path and ultimately tie together all of the secondary electronic assemblies of the recorder. Signals that need to interface to the recorder's primary electronic assemblies are grouped and travel to the cardcage half of the recorder via mass termination ribbon cable assemblies.

Aside from interconnecting assemblies, these MIL's provide coil drivers for the inner-channel event markers.
By providing these drivers, the number of high current paths running between the cardcage and transport assemblies is minimized.

The similarity between the MIL assemblies is considerable. The 2 channel MIL is a subset of the 4 channel. The 4 channel MIL is a subset of the 8 channel.

1.4.3 Description

The MIL assemblies, in conjunction with the mother boards, tie together all the secondary and primary electronic assemblies of the recorder.

System schematic diagrams and MIL schematic diagrams clearly illustrate the who's, what's and where's of all bussed signals.

The 2 channel MIL schematic is 297811.
The 4 channel MIL schematic is 297812.
The 8 channel MIL schematic is 297813.

1.5 DUMMY INTERFACE CL-810312

The Interface Assembly standard to the 3000 recorder product line resides in a dedicated slot, J43, of the recorder's card cage.

Via its "preamp connector", digital data and analog signals are interfaced between the recorder and 5900 preamp cardcage. Preamp definition and configuration data, printed out on the recorder's optional inner-channel annotation heads, takes this path.

The Standard Interface also connects all analog signal grounds to the recorder's signal common. This grounding path is required on all models, regardless of preamp configuration.

1.6 +/- 15V POWER SUPPLIES 497867

The majority of power consumed within the recorders is supplied from the +/- 15v supplies. The rate of consumption will vary depending on the operating frequency and amplitude of the penmotors. Nearly every electronic assembly within the recorder consumes at least a little power from these supplies.

The dual supply that provides this power is used across the product line. They are designed in such a way that they can be paralleled. Two and three identical supplies are installed in parallel in the larger model Recorders. They reside in dedicated slots within the recorder's cardcage. The actual number of required supplies will depend on the recorder's frame size, configuration and installed options, and not necessarily on the number of available dedicated slots.

An additional benefit of the supplies is that when operating in parallel they are designed to share their load evenly. This promotes a cool operation, which in turn promotes long life.

1.7 SERVO PEN DRIVE AMPLIFIER 897406

1.7.1 Introduction

This circuit board consists of two identical amplifier channels, plus a few common components associated with the digital controlled pen position, pen polarity and power output enabling circuitry.

1.7.2 Description

Each amplifier channel utilizes three proprietary modules with the following functions:

1.7.2.1 Oscillator / Demodulator Module 297498 (U2)

This module contains a 20 KHz sine and square wave source, a linear phase-sensitive demodulator, a filter and a buffer amplifier. This module supplies excitation for the Metrisite position sensor built into the penmotor and demodulates the Metrisite AC output into a DC position signal using a filter and buffer amplifier.

1.7.2.2 Servo Control Module 297499 (U1)

An external dip switch controlled attenuator accommodates +1, +2.5 or +5 volt signal inputs to the control module. This signal is summed in an operational amplifier with an external +5 volt pen positioning signal and fed to a limiter circuit which electronically stops the input "command" signal from driving the pen into the mechanical pen stops.

This limited input signal is modified by adding an adjustable portion of a velocity signal from the penmotor and a derived pen acceleration signal. In addition, an adjustable compensation network is used to modify the amplitude of the input signal as a function of signal frequency.

Finally, this modified input signal is compared to the DC position signal derived from the penmotor Metrisite sensor. The resulting + or - difference signal is used to modulate the on-time of a 20 KHz square wave. The resulting output can vary from zero to 100% on-time. The output signal has a value of +10 volts for a small error signal of one polarity and -10 volts if the error is of the opposite polarity.

As the error gets still smaller, the output becomes a voltage which switches between +10 volts at a 20 KHz rate. At zero error between the modified input signal and the feedback position signal from the Metrisite, the output is 50% on-time square wave at TP-5.

The U1 module also includes circuitry which monitors the amplitude of the sine wave which excites the Metrisite. The purpose is to disable the output stage in the third module if the 20 KHz oscillator fails. (If the feedback signal goes to zero, the pen position is unknown and the amplifier output goes full on.)

The disable output also drives the command input signal to zero on a normal "stop" signal from the recorder's controller, which causes the pen to center on the chart; the output is then disabled to make the pen go limp.

One more feature of this module is a circuit to provide a buffered output for tape or other monitor. This "monitor" output can be polarity reversed with the dip switch on the 897406 board.

1.7.2.3 Power Output Module CL-810380 (U3)

This circuit includes the drivers and Hybrid "H" Bridge, a MOSFET switching circuit (which alternately connects the penmotor drive coil from +15 to -15 volts, reversing the drive at a 20 KHz rate). Due to the inductance of the drive coil, only a tiny current has time to build up on each polarity reversal. The average current is zero, if a 50% square wave is impressed. If, however, the waveform becomes asymmetrical, appreciable currents of up to 2.5 amperes will flow through the 10 ohm penmotor. Since the power reversing switches are very low resistance when conducting (0.2 ohms) and open circuit otherwise with the square wave drive, very little power is actually dissipated in the MOSFET switches and the circuit efficiency is high. In addition, control is very linear through the zero average current condition, so that pen hysteresis (lack of pen stiffness) at crossover is overcome.

Also in this module is a MOSFET switch which disconnects the negative supply to the Hybrid bridge when the U1 module zeros the Enable input to the output module. It includes a time constant which works with the FET clamp Q1 in the 297499 module to make the pens zero center before losing power on "STOP".

1.7.2.4 Power Supply Circuits

Each channel on the Pen Servo board has its own +12 and -12 volt regulated supply for the low level circuitry. Both +12 volt supplies power the 5 volt regulator used for powering the digital circuitry.

This separate regulation insures against interaction between channels.

Circuit breakers are used to protect the individual penmotors from extended overloading or affecting all channels by shorting the system power supplies. They only protect the output modules.

1.7.2.5 Digital Circuitry

Individual 12 bit digital to analog converters (AU4 and BU4) are addressed by 4 bit bytes from the system controller. Their outputs supply 0 to +5 volt signals to operational amplifiers (AU5 & BU5). The amplifiers level shift and double the output to the -5 to +5 volt level required by the Servo Control module pen position input.

1.7.2.5 Digital Circuitry (cont.)

Digital chip U8, also is addressed by the system controller. Its four outputs are individually selected by the two input bits applied to board terminals 22 and 23 and the strobe on pin 15. Latches (U9) turn on and off relay K1A or K1B and control the pen polarity of channels "A" and "B". These latches can be "reset" to an initial condition via the system reset on board input pin 27.

The other two outputs of U8 enable the A channel or B channel D/A converter when a change in the pen position is requested via the control panel push buttons. U5 converts the 0 to +5 volt output of the D/A to +5 volts to swing the pen position through full scale chart deflection.

Transistor Q10 is used to ground the channel enable (pin 10 of U1) of both channel A and B. Both channels disable when board pin 26 is at +5 volts.

1.7.2.6 Miscellaneous

Super stable amplifiers AU11 and BU11 amplify the filtered velocity signals from the penmotor velocity coils by a factor of 6 and are used only with Thermal writing recorders. Trim potentiometers AR40 and BR40 are used to adjust the offset of these amplifiers to compensate for DC errors at the pen heat control circuit board which cause the trace darkness to differ depending on the direction of pen travel.

The 20 KHz "Sync" signal input is essential on multi-channel 3000 series recorders to prevent tiny magnetic leakage fields between penmotors from causing audible, and sometimes, visible pen modulation (beating) at the different frequencies. A small portion of a crystal controlled 20 KHz derived from the micro-processor 1 MHz clock is fed to each U2 chip pin 16 from a Motherboard bus on pin 88. This signal locks all channel oscillators to exactly 20 KHz eliminating the beat frequencies which would affect "span" calibration. (Note: Copper shields are used between penmotors to curb flux leakage.)

R6, labeled "Sq. Wave Comp.", is used to center the pen in the channel to compensate for mechanical offsets in the chart paper location and pen linkage/Metrisite tolerances. The electronic limiter adjustments may run out of adjustments range and the linearity suffer if R6 is not preset within one or two chart divisions at calibration with the pen position input zeroed.

1.8 +5V POWER SUPPLY 897515

1.8.1 Introduction

This assembly is used in all 3000 recorders. It resides in a dedicated slot, J31, in the recorder's cardcage.

1.8.2 Description

Aside from providing +5 volt power, 30 watts, for all the recorders logic circuitry, several other functions are provided. They are as follows:

1. Fuse and switch the A.C. line power for the recorder.

2. Provide input line filtering. Line filtering is a primary concern when extending the operating frequency of the recorder to 47-440 Hz. Both the power supplies and the line filter will physically handle high frequency operation, but at 400 Hz the line filter's leakage current exceeds the 500 micro-ampere safety limit set down by U.L. and I.E.C.. To operate the recorder at 400 Hz one must either accept 2 milli-ampere common mode leakage @ 120 VAC line, or specify a different line filter. Note: Common mode interference rejection is reduced as leakage current is restricted.

3. Provide user configurable, input line voltage selection via the voltage selection PCB card. The selected voltage is visible through the back panel window. The nominal voltage selection choices are 100 VAC, 120 VAC and 240 VAC. Functionally, the voltage selection card routes the A.C. line power to the +/- 15V supplies, the on-board +5V supply and the 13 VAC isolation transformer (used only in the 2 & 4 channel frame size models).

C A U T I O N:

All the recorder's power supplies will fail if the recorder is configured for 100 VAC or 120 VAC and the user inputs 220 VAC or 240 VAC.

4. Battery backup power stored in the battery holder is a AA 3.5 volt lithium cell, used to retain continuous accuracy of the Controller's real time clock.

5. The on-board Direct Current to Alternating Current voltage converter, U1, is used to provide dedicated power for the Vacuum Fluorescent Display used by the front panel.

6. Cardcage fan speed control is accomplished by a temperature actuated reed relay. Fan speed is switched from low speed to high speed when cardcage temperature reaches 40 degrees centigrade. The purpose of fan speed control is to limit fan noise.

7. A 20 KHz servo amplifier sync signal is generated and output to the servo amplifiers to synchronize the servo motor chopper circuitry. This accomplishes quiet pen motor operation.

1.9 CONTROLLER 897637

1.9.1 Introduction

The Controller Board is the heart of the unit. This board processes all the internal and external information to the unit. The 6809 microprocessor (uP) on the Controller Board has the ability to "talk" to every circuit board in the unit. It does this via the data bus (D7-D0) and the chip and board select signals (PAPER, CHART, INFCE, etc..). Through inquiry to these boards, the processor can determine such things as which button was pressed, what command was sent over the interface, how much paper is left in the unit, and other pieces of recorder data.

1.9.2 Description

The processor system consists of the 6809 microprocessor (U1), data bus driver (U4), address bus and control signal driver (U3), and master clock oscillator (Y1). The 6809 controls virtually all of the recorder functions through the execution of the control program which resides in EPROM (U9). The other sections of this board are the address decode circuitry, real time clock, memory, interrupt logic, event/timer marker logic, standard annotation head logic and driver, watchdog timer for both annotation head and microprocessor operation, remote connector logic, preamp communication logic, and trigger level circuitry.

Address decode circuitry consists of the address decoders (U5, U6, U7, U43) and the gating to create the valid read enable, valid write enable, and valid memory address (VRE-, VWE-, WMA-) signals (U15, U16, U17, U32).

The Real Time Clock consists of U11, Y2, C2, C3, Q2 and R10. Each digit is individually addressable by the microprocessor and can be changed. Backup voltage is supplied by a "AA" size battery located on the +5v Power Supply board (P/N 897515) through J1-60.

The memory on this board consists of 512 bytes of non-volatile RAM (NovRAM U10) and 2K bytes of CMOS RAM (U40). All control settings, test numbers, run times, pen positions, user messages, pen polarities, etc.., are stored in this NovRAM. Upon power up, the uP reads the cold start/warm start switch (SW1-1). If in cold start, the uP will fill the NovRAM with default information and values. If in warm start, the uP will do a non-volatile recall of the NovRAM and use the last saved set of conditions from when the recorder was powered down to set up the recorder. In this way, the recorder will power up exactly as it was powered down previously. The CMOS RAM is used to store inter-channel messages, preamp status and as a general scratch pad memory.

The Interrupt Buffer and Logic (U26 and U27) allow a means for the other boards in the unit to communicate with the uP. All the incoming interrupts are gated together using U26. A LOW on any line will generate an IRQ- to the uP. The uP reads the buffer at U27 and, using the byte read, determines the interrupting device.

1.9.2 Description (cont.)

The Event/Timer Marker logic consists of 2/3 of U12, U13, U14 and U17. One timer on U12 counts a uP programmed number of 1 MHz E-clock pulses. On reaching this number, it issues a pulse to another timer on U12 which actually creates the timer pulse. This pulse deflects the timer marker in the desired direction in accordance with the steering logic of U13. U13's job is to determine when to direct the tenth pulse to the right event coil rather than the left coil. In this way we get our bi-directional timer marks. U14 and U17 allow LEFT MARK and RIGHT MARK from the front panel as well as R EVENT and L EVENT from the REMOTE connector to be gated in with the timer marks.

The Standard Annotation Head logic and driver consists of the other 1/3 of U12, U19 and U20. Upon receiving an interrupt from the Chart Drive board (via J1-32 to U39A, pulling down the FIRQ- line), the uP will write the next raster of data to be printed on the standard annotation head to the latch which is U19. This also triggers the countdown timer on U13 which counts a pre-programmed number of 1 MHz (1 ms) pulses (which is a function of the present chart speed) and then issues a CLR- pulse to U19. The Darlington drivers in U20 pull down on the elements to be printed for that amount of time.

The Watchdog Timer circuit is essentially a two-fold operative circuit. It monitors both annotation head on time and uP memory access frequency. First, the act of writing to the annotation head latch (U19) also triggers the annotation head watchdog by toggling U36A (a D-type F/F wired as a T-type). This allows Q-clock pulses to be counted by U37. If U37 counts 1024+512=1536 pulses (or usec) before getting a CLR+ pulse via U15-6 (which is initiated by the same CLR- pulse from U13 that clears U19), U15-3 goes low and is clocked over to the RESET line via U36B and U32. The processor is reset along with the annotation latch and the head is saved from burning out. Second, should the uP NOT access the program memory (U9) at least once in a 50 usec period (signified by CODE- going low, thus clocking U35A), a RESET will be issued via U35B-5 and U32.

The Remote Connector buffer provides an input port for remote connector inputs (S2-, S1-, S0-, D1-, D0- & REMOTE-). By monitoring these signals when REMOTE- is pulled low, the uP can make the recorder run at the speeds specified by the speed and divide-by bits. Speeds are per the table on the following page:

1.9.2 Description (cont.)

S2-	S1-	S0-	Base Speed Selected
0	0	0	500 mm/sec
0	0	1	250 mm/sec
0	1	0	100 mm/sec
0	1	1	50 mm/sec
1	0	0	25 mm/sec
1	0	1	10 mm/sec
1	1	0	5 mm/sec
1	1	1	EXTERNAL

D1-	D0-	Divisor Selected
0	0	/100
0	1	/60
1	0	/1000
1	1	/1

The Preamp communications logic (U39B, U42, U43) allows the uP to communicate with the Interpreter board in order to obtain preamp status information for inter-channel annotation or, in the cases of 3200 and 3400 chassis, to pass commands to the preamps which are received via the recorder's RS-232 or IEEE-488 interface. When the uP writes to the Interpreter through bi-directional U42, it generates an interrupt to the Interpreter. The uP monitors this line until it goes high again, indicating the Interpreter has taken the byte. The uP then is able to write the next byte of data. This process works in reverse when the Interpreter talks to the uP on this Controller board.

The Trigger Level Circuit (U8, U25, U28 & U29) functions as an amplitude triggering circuit. After a trigger level is set and entered using the pen position controls for channel 1 as outlined in the User's Manual, this level is written to U25. U25 works in conjunction with U28, creates an analog level corresponding to this code and presents it to the comparator (U29). When the analog level at U29-3 exceeds this TRIGGER level, an interrupt is generated by U8 to the uP IRQ line. The greater than/less than status of the trigger level is monitored by the processor via U41-13 on D5.

1.10 KEYBOARD 897843-1, -2, 897844-1, -2, -3, 897783 and CL-810186

1.10.1 Introduction

The Keyboard is responsible for the Vacumn Florescent Display (VFD) drive, and keyboard data entry.

Refer to following Schematic Diagrams:

RS 3200	297843
RS 3400	297844
RS 3600	CL-210186
RS 3800	297783

1.10.2 Description

The main keyboard is scanned by U2 which also controls U3 and uses it to help in this scan. When a key is pressed, U2 detects the short and, after 1 10 ms debounce, confirms the depression. It creates the unique code for that particular key and generates an IRQ- interrupt to the Controller Board via U4. The Controller (P/N 897637) can then read this code using U1 and U9 to create the proper strobes. U2 has an 8 byte memory for key press storage and is RESET on power-up and whenever the STOP key is pressed.

The Pen Position keypad is scanned by U7 in much the same manner as U2 scans the main keyboard. However, the line which generates the IRQ- interrupt to the Controller from U7 stays low as long as a pen position key is being held depressed. In this way, the Controller uP can monitor the length of time a pen position key has been pressed and move that pen faster the longer the key is held down.

The VFD is driven by U10, U11, U12, U13 and U14. The uP on the Controller Board sends the 5x7 bit pattern of the data to be displayed to U10 (which is cascaded to U11 and U12). After this data is sent, the bit pattern for turning "ON" the proper anode for this particular character is sent to U13 (which is also cascaded to U14). When all information is fed to these chips, the Controller issues the LATCH commands (BLATCH AND GLATCH) which displays this data as an ASCII character. The entire process is then repeated for the next characters until the entire 16 character message is displayed. This entire process is repeated as long as the message is to appear in the display.

1.11 PAPER SUPPLY/INTERLOCK/MOTION SENSORS

1.11.1 Introduction

The 3000 Recorder incorporates photo-sensors to measure the remaining supply of chart paper and detect a paper out condition.

1.11 PAPER SUPPLY/INTERLOCK/MOTION SENSORS

1.11.2 Paper Remaining Sensors

There are five reflective photo-sensors mounted on a PC board behind the metal plate on the left side wall of the 3000 paper compartment. These sensors view the left end of the supply roll of chart paper (or the left end of a stack of paper) in the compartment. Each sensor contains both a source of infrared light and a photo detector.

The five sensors are located in an inverted "L" pattern so that they work for both fan-fold and roll paper and sense the presence of the white edge of the paper roll or stack. The vertical row of sensors views the height of the fan-fold stack and the horizontal row of sensors views the diameter of the roll paper.

The present controller software only makes use of the end two sensors on each leg to determine three conditions of paper supplying remaining. If both sensors are "seeing paper", the controller will cause the panel display to read "SUPPLY = 100% - 50%". If only the end sensor "sees" reflected IR light, the panel display reads "SUPPLY = 50% - 25%". When no sensor receives reflected IR light the display will read "SUPPLY = 25% - 0%".

The sensors are NPN photo-transistors which are high resistance for dark condition and low resistance for the illuminated condition. Approximate operating distance for the sensors is .12 to .3 inches. Each signal is buffered separately by U4 located on the 897635 Paper Supply board and sent to the controller via the Mother-in-Law board and backplane circuits. Sensors are paralleled for the fan-fold and roll functions.

1.11.3 Paper Out Sensor Board (Refer to Circuit Diagram CL-210240 & 297912)

The CL-810240 board is mounted to the left side plate on a small bracket just above the top left edge of the recorder's writing table - just before the paper reaches the top roller.

Its purpose is to send an interrupt to the recorders controller and shut the system down before the paper end reaches the pens or Annotation Head. These items may be damaged by overheating, in the case of Thermal recorders, or damage the rubber roller on which they write. The interrupt generated shuts down the pen heat system as well as the chart drive. It will also sense gross mis-threading of the chart paper.

The "Paper Out" sensor incorporates a transistor current amplifier to increase its sensitivity distance to .12 to .5 inches. The sensor still acts as a varying resistor and is connected in series with the "Table Open" sensor. Either sensor, deprived of a reflected signal will cause U4 on the 897635 Paper Supply board, which buffers this interrupt signal, to pass it on to the Mother-in-Law backplane board where it goes to the controller bus.

1.11 PAPER SUPPLY/INTERLOCK/MOTION SENSORS

1.11.4 "Table Open" Detection (Part of Cable Assembly 897912)

A reflective sensor views the bottom left edge of the writing table as it swings into the operating position. Since the photocell is in series with the Paper Out sensor it also prevents the annotation head(s) and pens from writing and the chart drive from operating by generating a system interrupt.

1.11.5 Speed Monitor Board (Schematic Diagram CL-210290)

Attached to a shaft driven by the stepper motor is a transparent disk with an opaque mark every 3 degrees of rotation on its outside edge. The edge of the disk moves in the gap of an "interrupter sensor" which has an infrared source on one side and a photo sensor with a .010 x .020 inch viewing area. For every .014 inch of chart paper movement the sensor sees one light pulse and uses a Schmitt trigger circuit to square up the waveform.

NOTE:

The Mother-in-Law board supplies the pull-up resistor required on Board P/N CL-810290.

This sensor serves two functions:

a. It is a stepper motor "stall" detector used by the controller -- if the motor is supposed to be stepping and these pulses do not occur, the controller microprocessor is programmed to recognize this condition and it will attempt to ramp the motor up to speed three times before displaying a "stall" error message. A broken belt or loose motor pulley will also be detected.

b. It serves as an "arming trigger" for the annotation head "write" function. Unless one or more pulses occur between the last write command and the time when the head is supposed to write again, the paper has not moved under the head and write commands are inhibited. Annotation heads write each .016 inch of paper (32 motor micro steps). If heads write too often, overheating and damage may occur.

1.12 INTERCHANNEL ANNOTATION CL-810191

1.12.1 Introduction

The Interchannel Annotation Driver board is the board which drives the interchannel annotation heads. This board is required if interchannel annotation is desired in either ink or thermal units. Each board will support two (2) interchannel annotation heads.

1.12.2 Description

The microprocessor on the Controller Board (P/N 897637) writes the raster of interchannel annotation data to be printed for a particular channel to the proper octal latch (U1 and/or U2) on the interchannel annotation driver board. The outputs of these latches enable Darlington drivers U3 and U4 which pull the proper elements of the heads in question to approximately +1.5v thus creating the marks on the paper as needed. After printing for a programmed amount of time, which is a function of present chart speed, the uP on the Controller board then clears latches (U1 & U2) to prepare for the next raster to be printed.

Since the heads come in three basic grades (A, B & C), the voltage across them becomes a function of the head power efficiency. Diodes (CR2, CR3, CR4 & CR5) are voltage dropping diodes either put in series with or shorted out of the power line. The flex cables are punched with holes according to the head grade which opens connections to these diodes. In this manner, any grade head can be used with any driver.

SECTION II

CALIBRATION

2.1 INTRODUCTION

This section provides the performance test, mechanical adjustments and electical calibration procedures for the Gould 3200 and 3400 Thermal Recorders. The performance verification test compares the recorder's performance to its specifications. The performance test is recommended as an acceptance test when the unit is first received, and later as a verification of the recorder's accuracy at scheduled calibration periods. It is recommended that the performance test be run and the results recorded prior to attempting any electical calibration of the unit. The calibration procedure should be performed after repair of the recorder and/or when the unit fails the performance test. If the recorder will not respond to, or meet the limits of the calibration procedure, repair is indicated. The recorder must be allowed to warm-up for at least 15 minutes before starting the performance verification test or the calibration procedure.

2.2 EQUIPMENT REQUIRED

a. Gram Gauges for 0 to 50 and 0 to 150 ranges
b. D.C. Calibration Source
c. Function Generator
d. DVM
e. Oscilloscope
f. Frequency Counter
g. Remote input connector - Gould Part No. 244550-37, supplied with recorder
h. Signal input connector - Gould Part No. 245537-37, supplied with recorder
i. Annotation head "Alignment Gauge" Gould #CL-211327 (.010" feeler gauge)
j. Extender card - Gould part No. CL-210472
k. Meterstick
l. Multiple spline wrench - Gould Part No. 1-120922-2
m. Analog Voltmeter
n. Four - 100 Ohm, 1 watt, 5% resistors

NOTE:

Allowed the recorder to warm-up for at least 15 minutes before starting the performance verification test or the calibration procedure.

2.3 MECHANICAL/VISUAL INSPECTION

2.3.1 Before Power-Up

Check for obvious defects such as loose hardware or handling damage.

Inspect push buttons for alignment, nomenclature and non-binding operation, sliding pushbutton covers for smooth operation.

Check orientation of line voltage selector (View thru opening on the 5 volt supply - below line cord).

2.3 MECHANICAL/VISUAL INSPECTION

2.3.1 Before Power-Up (cont.)

Inspect for free movement of annotation arm(s), on to the writing table. They should be spring loaded toward the table silicone roller at 100 grams pressure.

2.3.2 Power Off - Chart Paper tracking Stabilized

Check pen tip at the center of its channel for proper length. All pen tips should write within 1/2 mm of each other and parallel to the chart time lines within 1/8 mm total skew. Then check for pen "skew" (a variation from the proper time line as the pen tip is moved manually to the left and right extremes of its channel.

Check pen pressures to be 30 +/- 5 gm for thermal analog pens. Also, 30 gms +/- 5 for event pen(s). Measure with spring gauge hook at pen tip held at 90 degrees to the paper surface.

Check mechanical pen stops by manually moving each analog pen to its right and left mechanical limits to assure the pen tip excursion is 2.0 to 2.5 mm beyond the chart edge. Exception is channel 1 left edge which should be at least 1 mm beyond edge.

Check each event marker pen tip for alignment on chart event "ladder" printed on the chart paper. Mechanically, the base of the marker assembly is squared to the "Bumper strip", on the recorder. The pen is turned to center the pen tip on the chart event "ladder" by loosening the two #0 screws securing the pen to its mounting. Event pens deflect left and right and should be adjusted within 0.1 mm of "latter" center after the paper tracking has stabilized. All event markers are to be tested for proper 1 to 1.5 mm deflection and operation after power is applied via the TTL inputs on the remote connector.

2.4 PERFORMANCE TEST PROCEDURE

2.4.1 General

The following performance test systematically checks each function of the recorder. The performance test can be run completely as an acceptance test or partially if certain functions are in question. To ensure optimum results, the performance test should be conducted at an ambient temperature between 20 to 30 degrees Centigrade, with relative humidity of less than 70%. If the recorder has been brought indoors from the cold allow it to completely warm to ambient temperature before applying power.

2.4.2 Preliminary

Install chart paper in the recorder, refer to Section IV of the 3000 User's manual for details on paper loading.

Set rear panel switches as follows: (Toward the PC board is ON)

Servo boards:
SW position 3 ON SW positions 1, 2, 4, 5, & 6 OFF

Controller board:
SW positions 2 OFF SW positions 1, 3 & 4 ON

2.4.2 Preliminary (cont.)

Cold start the recorder by turning power switch on, Display will read "CHECKSUM= " with a 4 digit hexidecimal number following equal sign.

Turn power switch off and set position 1 of the Controller board to OFF. Turn power switch on, Display should read "STOP".

2.4.3 Front Panel Controls

Press "5" button. Chart will run at 5 mm/sec and display reads "5 MM/S".

Press "10" button. Chart will run at 10 mm/sec and display reads "10 MM/S".

Press "25" button. Chart will run at 25 mm/sec and display reads "25 MM/S".

Press "50" button. Chart will run at 50 mm/sec and display reads "50 MM/S".

Press "100" button. Chart will run at 100 mm/sec and display reads "100 MM/S".

Press "250" button. Chart will run at 250 mm/sec and display reads "250 MM/S".

Press "500" button. Chart will run at 500 mm/sec and display reads "500 MM/S".

Press "STOP" button. Recorder should decelerate to STOP. Display reads "STOP".

NOTE:

In the following keypad tests, each time the "SET" button is pushed, the display will indicate "FUNCTION TO SET?". If you desire not to set a function after the key is pushed, depress the "STOP" key.

2.4.4 Var Speed

Depress the "SET" pushbutton.

Depress the "CHART SPEED" function key.

Enter "15 MM/S" by pressing the "1" and "5" keys on the numeric keypad.

Depress the "ENTER" function key.

Depress the "VAR SPEED" pushbutton on the top level controls. Recorder should run at 15 MM/S.

Repeat above steps entering 135 mm/sec instead of 15 mm/sec.

Press "STOP" to stop the recorder.

2.4.5 Date

Depress the "SET" mode button.

Depress the "DATE" mode button. The display will read "DD-MMM-YY".

Enter the date from left to right in Day, Month, and Year format using the keypad. The shift key does not have to be used.
Example: "01","JAN","88"

Depress "ENTER" function key.

2.4.6 Time

Depress the "SET" mode button.

Depress the "TIME" mode button. The display will read "HH:MM:SS".

Enter the desired hours, minutes and seconds from left to right using the keypad. The shift key does not have to be used.

Depress "ENTER".

Depress the "TIME" button and verify on the display that the time is correct and the clock is running.

Depress the "DATE" button and verify on the display that the date is correct.

2.4.7 Pen Position Check

Run the recorder at 5 mm/sec. On channel 1, push and hold the left pen position button. The pen should move to the left, slowly for a few seconds then at a faster velocity as long as the button is held.

Push and hold the right position button. The pen should move to the right, slowly for a few seconds then at a faster velocity as long as the button is held.

Position the pen to the center of the chart. Each short push will move the pen only a small amount for precise settings.

Repeat for all analog channels.

2.4.8 Trigger Level

NOTE:

RUN TIME & CHART SPEED must accompany the trigger level setting. RUN TIME is the length of time that the programmed chart speed is to run after the SET TRIGGER is exceeded. The run time can be set between 00-99 seconds. The trigger level input is pin 31 of the remote control connector on the controller board.

Set the recorder to "STOP". Apply a ground (0V) to pin 31 on the remote connector. Both pins 29 and 30 are common.

Depress the "SET" pushbutton.

Depress the "CHART SPEED" pushbutton.

Enter 15 mm/sec by pressing the "1" and "5" buttons

Depress the "ENTER" button.

Depress the "SET" button.

Depress the "RUN TIME" button.

Enter 5 seconds by pressing the "5" key.

Depress the "ENTER" key.

Run the chart at 5 mm/sec and depress the "SET" button".

Now depress the "TRIGGER LEVEL" button. Using the pen position control buttons for channel 1, position the trace to 10 divisions left of chart center in channel 1.

Depress "ENTER" button. The position will be stored and the trace will return to its original postion on the chart.

Depress "STOP".

Connect the + terminal of a variable DC supply (0-5) to Channel ONE analog input (+) and to pin 31 (-) on the remote connector. Connect the - terminal to Channel ONE common and to pin 29 or 30. Set for 0V.

Run the chart at 5 mm/sec. Toggle the "TRIG LEVEL" button several times and note message "TRIGGER OFF" AND "TRIGGER ON" will be displayed. Leave in "TRIGGER ON".

With chart running, slowly increase the DC input voltage. When the input voltage reaches 10 $\pm$ 1 divisions left of chart center, the recorder will run at 15 mm/sec. Immediately reduce the input voltage to 0V. After 5 seconds the chart will revert back to 5 mm/sec. Accuracy of trigger level voltage is apx. 10%.

Retrigger the unit and leave the voltage applied. Note the chart will continue to run at 15 mm/sec as long as the level exceeds 10 divisions. Set the level to 0V and the recorder will revert to 5 mm/sec.

2.4.9 Event Timer

Depress the "SET" button.

Press the "EVENT TIMER" several times, noting that the display will indicate various settings plus TIMER OFF. Check that the following settings appear: .1 Second, 1 second, 10 seconds, 100 seconds, .01 minutes, .1 minutes, 1 minute TIMER OFF. Stop at setting of 1 SECOND and press" ENTER" to lock 1 second timing marks into memory.

With the recorder running at 5 mm/sec ensure that the right event marker operates at the setting entered.

Press "SET" then "EVENT TIMER" several times until "TIMER OFF" appears. Then press "ENTER" and note the timer stops. Stop the recorder.

2.4.10 Rewind

Press "REWIND" and note that the message "OPEN TABLE FIRST" appears in the display.

Gently open the writing table making sure pens are not caught on the paper. Also note that "INTERLOCK" message will appear in the display.

Depress the "REWIND" button. The chart roll should rewind at 50 mm/sec for about 6 seconds and stop.

Close the table and run several feet of paper out at about 50 mm/sec to re-center the paper on the table. Press "STOP".

2.4.11 Test Number

Depress ""SET" button.

Depress "TEST NO" button.

Enter 84 by pressing the "8" and the "4" buttons on the keypad.

Depress "ENTER".

2.4.12 User Message

Depress the "TEXT" pushbutton. The display should indicate USER MESSAGE >. Please note that pressing the "TEXT" key will erase contents of the message buffer. The buffer has a capacity of 256 characters.

Depress the "SHIFT" pushbutton to obtain the status of letters or numbers. The display should indicate "SHIFT ON" or "SHIFT OFF" depending on the status. Each push of the "SHIFT" key will change the status. With "SHIFT ON" all 26 letters of the alphabet can be entered (indicated in blue on the keypad). With "SHIFT OFF" the numeric key pad 1 thru 0 plus the period are enabled. The SPACE is effective in both modes.

2.4.12 User Message (cont.)

Enter the following message: ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890.@@ The "@" is obtained by pressing "TEXT" key (in the "SHIFT ON" mode).

Depress the "DELETE" key and note one "@" is erased.

Depress "ENTER" to enter the message into memory.

2.4.13 Status Check

Toggle the "PRINT" key several times and note the display indicates "ENABLE ANNOTATION" and "DISABLE ANNOTATION". Leave in "ENABLE ANNOTATION".

With the Chart Stopped, depress the "STATUS" button. The display will indicate, in succession, the status of the recorder as follows: "ANNOTATION ON; TIME ON; DATE ON; STOP ON; TEST# 84 ON; MESSAGE< ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890.@ MESSAGE ON; followed by STOP".

2.4.14 Amp Print Check

With no amplifiers installed, depress the "AMP PRINT" button.

The display should indicate "AMPS UNAVAILABLE".

2.4.15 Keyboard Lock

Run the chart at 5 mm/sec.

Toggle the "LOCK" button several times and note the display reads "KEYBOARD LOCKED" AND "KBD UNLOCKED". Leave in the "KEYBOARD LOCKED" mode.

Activate the left and right "MARK EVENT" buttons and verify the right event marker functions.

Depress every other key and button on the front panel except "LOCK" and "STOP". Note no action occurs. Verify also that the pen positions controls are locked.

Press "STOP" and verify recorder stops.

Press 5 mm/sec and verify recorder will not run and display will indicate "KEYBOARD LOCKED".

Depress "STOP" and unlock the keyboard by pressing "LOCK" again.

2.4.16 Divide by Checks

Set the recorder to "STOP".

Locate the DIP switch on the Controller Board and set the switches as follows:

SW positions 1,2 & 4 OFF
SW position 3 ON

Run the chart recorder at 100 mm/sec and toggle the "DIVIDE BY" button. Note that the display and the chart speed will toggle between 100 mm/sec and .100 mm/sec. This is divide by 1000.

Set SW position 3 to OFF and toggle the "DIVIDE BY" button. Note that the display and the chart speed remains at 100 mm/sec. This is divide by 1.

Set SW position 4 to ON and toggle the "DIVIDE BY" button. Note that the display and the chart speed will toggle between 100 mm/sec and 100 mm/min. This is divide by 60.

Set SW position 3 to ON and toggle the "DIVIDE BY" button. Note that the display and the chart speed will toggle between 100 mm/sec and 1.00 mm/sec. This is divide by 100.

Depress the "STOP" button.

2.4.17 Local/Remote

While in "STOP", toggle the "LOCAL/RMT" button and note the display reads "LOCAL" and "REMOTE". Leave in "REMOTE".

Depress 5 mm/sec and note the recorder will not run and the display will indicate "3000 IN REMOTE".

Depress the "LOCAL/RMT" button once and the display should read "LOCAL". Depress "STOP".

2.4.18 Chart Supply and Interlocks

Set the recorder to "STOP".

Open the chart table, remove paper and note the display reads "INTERLOCK".

Defeat both the table and the chart paper out interlocks by covering them over with paper. Note the display reads "STOP" when both are defeated.

Check that by uncovering EITHER interlock the message "INTERLOCK" will appear on the display. Re-defeat both interlocks.

With both interlocks defeated, ensure no paper is in the recorder and locate the 5 paper sensors on the left side plate.

2.4.18 Chart Supply and Interlocks (cont.)

Will all sensors uncovered, press the "CHART SPLY" button on the front panel. The display should read "SUPPLY = 25% - 0%".

Cover the bottom sensor and press the "CHART SPLY" button again. The display should read "SUPPLY = 50% - 25%". Repeat covering only the front top sensor. Same display should result.

Cover the bottom and the middle sensors and press the "CHART SPLY" button again. The display should read "SUPPLY = 100% - 50%". Repeat covering the two front sensors. Same display should result.

Cover all five sensors and press the "CHART SPLY" button again. The display should read "SUPPLY = 100% - 50%".

Uncover all interlock sensors, re-install paper and close the table.

2.4.19 Event Markers

Run the chart at 5 mm/sec and press the "LEFT EVENT" button. The right event marker should deflect to the left apx. 1-2 mm and remain deflected as long as the button is held.

Repeat with the "RIGHT EVENT" button and check for right deflection.

Enable the timer and set for 1 second. With the chart recorder running, check for 1 second event marks. The deflection will be left for 9 pulses and right every tenth pulse.

2.4.20 Chart Speed Accuracy

With the chart running at 500 mm/sec and the 1 second internal timer enabled, allow the chart to run for 3 to 4 meters of paper.

Using a meterstick, measure the distance between the leading edge of two 1 second pulses. This should be 1000 mm +/- 2.5 mm for an accuracy of 1/4%.

Change the speed to 5 mm/sec and run for at least 2 meters of paper. Measure the distance between 20 of the 10 second pulses. This should be 1000mm +/- 2.5 mm for an accuracy of 1/4%.

Stop the recorder.

2.4.21 Annotation Printing

Run the chart recorder at 25 mm/sec and enable the annotation by pressing the "PRINT" key until "ENABLE ANNOTATION" is displayed.

The annotation date is printed in left margin as follows: Time arrow, actual time, date, chart speed, test # and message. The sequence is repeated continuously.

Change the chart speed to 10 mm/sec and note the annotation resets and begins a new sequence with the arrow.

2.4.22 Self Test

Run the recorder at 10 mm/sec and DISABLE ANNOTATION. With no inputs to the recorder, set channel 1 position to 10 mm from the RIGHT chart edge. Center all other analog channels. Set the EVENT TIMER to "TIMER OFF".

Press the "SELF TEST" button. The following sequence should occur: The recorder will run at 25 mm/sec. All analog channels will deflect to the left electrical limit and ramp toward the right electrical limit. During this time the left annotation head will print a series of alpha characters and numbers and the timer will operate at .1 MIN intervals (apx 1 pulse every 16 mm). When the pens reach the right limits, channel 1 will deflect to the left and at the same time a "bar" will be printed by the annotation head. Then channel 1 will deflect to the right and all other analog channels will deflect to the left.

Examine the results and ensure that the printed "bar" is aligned with the channel 1 left deflection, that the right deflection of channel one and the left deflection of the remaining analog channels are on the same time line. Specifications for both are .005"

Check that all analog traces deflected into the Right and Left ELECTRICAL limits, which are 1 to 1.5 mm beyond the chart edges (see step 2.4.24).

Stop the recorder.

2.4.23 Chart Centering and Paper Tracking

With Roll paper installed, run the recorder about 6 feet at 100 mm/sec to align paper.

The chart paper should center on the table within +/- .050".

Run the chart at 500mm/sec for about 10 seconds and note pen tip location and wander. Use an event marker for reference.

Change speed to 5 mm/sec and run for about 20 seconds. Then change speed to 25 mm/sec and run for about 20 seconds.

Examine all three traces. The median tracking point of the event marker should be within +/- .025" of the event ladder. The TOTAL chart wander must not exceed +/- .025" over the entire run.

2.4.24 Limits

With the chart stopped, manually move each analog pen to the right and left MECHANICAL limits. The pen tip excursion should be 2.0 to 2.5 mm beyond the chart edge. Exception is channel 1 left edge which should be at least 1 mm beyond edge.

With no inputs to the analog channels, run the recorder and center all the analog channels.

Apply a 1 hz triangle wave to each drive amplifier mini-jack input. Adjust the amplitude to drive the pen into the electrical limits. (About 6V P/P).

Observe the chart traces and ensure that the pen excursion is 1 to 1.5mm beyond the chart edges.

2.4.25 Frequency Response

With the chart running at 25 mm/sec, change the input to sine wave at 1 hz. Adjust the input amplitude for full scale output on one of the channels. Increase the frequency as per table below and check for outputs as indicated:

40 mm channels	--	DC to 60 hz +/- 1 division
50 mm channels	--	DC to 50 hz +/- 1 division
100mm channels	--	DC to 30 hz +/- 1 division

For 100mm channels only, reset input frequency to 1 hz and input amplitude to display 50mm (1/2 scale) P/P. Increase frequency to 50 hz and check for 50mm +/- 1 division.

Reset input frequency to 1 hz and input amplitude for 10 divisions P/P on the chart. Increase frequency as per table below and check for outputs as listed:

40 mm channels (10 div)	--	DC to 140 hz +/- 1 division
40 mm channels (10 div)	--	-3db down max at 160 hz (7 div or more)
50 mm channels (10 div)	--	DC to 125 hz +/- 1 division
50 mm channels (10 div)	--	-3db down max at 140 hz. (7 div or more)
100mm channels (10 div)	--	DC to 125 hz +/- 1 division
100mm channels (10 div)	--	-3db down max at 140 hz. (7 div or more)

2.4.26 Overshoot

Run recorder at 25 mm/sec and apply a 1 hz square wave to the inputs. Set amplitude for 90% FS.

Check for less than 1% overshoot F.S.

Change input amplitude to 20% of full scale.

Check for less than 1% overshoot F.S.

2.4.27 Amplitude Accuracy and Linearity

Connect a 0-10V dc source to each Drive amplifier input. Set the voltage to 0V.

With the chart running, center each analog pen.

Apply +2.500V DC to the inputs. The pens should deflect left full scale +/- .2% FS.

Apply +2.500V DC to -2.500V DC in steps of .500V.

Left chart edge accuracy is .2% FS. All other points must be within .35% FS.

2.4.28 Channel Reverse

Set input to Channel 1 to 0V DC.

Run the chart at 5 mm/sec and center the pen with the pen position buttons.

Depress "REV POL".

Message "CHANNEL NO. =" will appear in display.

Depress "1" pushbutton. Note the pen position may shift up to 20% from chart center. Re-zero the pen to chart center as needed.

Apply +2.500V DC to the channel 1 input.

The pen should deflect to the right full scale within .35% F.S.

Change input to 0V DC. Reverse channel one again to return channel 1 to Normal polarity.

2.4.29 Servo Amplifier Options

Set switches on the servo amplifiers as follows:

(RIGHT = OFF and LEFT = ON)

SW position 2 ON
SW positions 1, 3, 4, 5 & 6 OFF
(set up for 2V F.S.)

With 0V DC applied to inputs, center the pens.

Apply + and - 1.000V DC to the inputs. The pens should deflect FS Left within .2% and FS Right within .35%.

Set inputs to 0V and reset servo switches to:

SW position 4 ON
SW positions 1, 2, 3, 5 & 6 OFF
(set up for 10V F.S.)

2.4.29 Servo Amplifier Options (cont.)

Center the pens if necessary and apply + and - 5.000V DC to the inputs. The pens should deflect FS Left within .2% and FS Right within .35%.

Apply OV DC to the inputs and reset servo switches to:

SW positions 1 & 3 ON
SW positions 2, 4, 5 & 6 OFF
(set up for 5V F.S. and reverse monitor output)

Connect a DVM to the Output Monitor BNC jack on the servo board on channel 1.

Center the pen as needed and note the output as read on the DVM. The output should be OV +/- 1V.

Move the pen to the left and note the voltage becomes more negative. Move the pen to the right and note the voltage becomes more positive.

Recenter the pen and adjust position for 0.0V as read on the DVM. (Pen may NOT be at chart center).

Apply +2.000V to the input. The pen will deflect to the left 20 divisions from referenced zero and the output as read on the DVM will be MINUS 2V (apx).

Set Switch S1 to OFF (Normal polarity) and note the pen is still deflected to the left but the DVM now read +2V (apx).

Repeat above procedure for all channels.

2.4.30 Remote Inputs

Remove all input connections from the servo pin jacks.

For all connections below, the common is either pin 29 or pin 30 of the remote connector on the master controller board. Remote input connector - Gould Part No. 244550-37, supplied with recorder

Connect a frequency counter to the remote connector pin 27.

Run the recorder at 100 mm/sec and observe the output frequency of 8 khz +/- .25% (+/- 20 hz).

Set the recorder to Stop. Remove the connection from pin 27. Connect a Zero-based square wave of +3.5V peak to pin 28.

Set the frequency to 1 khz and set the recorder to EXT. Turn the timer on at 1 second rate. Note the chart recorder runs at about 12.5 mm/sec.

Ramp the input frequency to 8.000 Khz. Measure the accuracy of the chart speed. It should be 100 mm/sec +/- .25% (+/- 2.5mm).

2.4.30 Remote Inputs (cont.)

Ramp the input frequency to 40.000 Khz. Measure the accuracy of the chart speed. It should be 500 mm/sec +/- .25% (+/- 2.5mm).

Set the recorder to "STOP" and remove the connection from pin 28.

Make closure connections to pins 1,2,22,23,24,25 and 26. These will be closed to ground (low true) in the following remote chart speed tests. Pin 1 operates on edge triggering while the remaining pins can be held in one state.

Set the recorder to STOP. Make the following tests and observe results on the display and by the chart motion.

An O in the column indicates open pins
An X in the column indicates shorted pins
A P in the column indicates to pulse low and return to open

1	2	S0 22	S1 23	S2 24	D0 25	D1 26	Results
0	0	0	0	0	0	0	RECORDER STOPPED
X	0	0	0	0	0	0	RECORDER IN EXTERNAL
X	P	0	0	0	0	0	RECORDER STOPPED
X	0	X	0	0	0	0	CHART SPEED OF 5 MM/SEC
X	0	0	X	0	0	0	CHART SPEED OF 10 MM/SEC
X	0	0	0	X	0	0	CHART SPEED OF 50 MM/SEC
X	0	0	0	X	X	0	CHART SPEED OF .050 MM/SEC
X	0	0	0	X	0	X	CHART SPEED OF 50 MM/MIN
X	0	0	0	X	X	X	CHART SPEED OF .50 MM/SEC
X	0	0	0	X	0	0	CHART SPEED OF 50 MM/SEC
X	P	0	0	X	0	0	CHART STOPPED
0	0	0	0	X	0	0	CHART STOPPED
0	0	X	X	X	0	0	CHART STOPPED
P	0	X	X	X	0	0	CHART SPEED OF 500 MM/SEC
0	P	X	X	X	0	0	CHART STOPPED

Remove connections from the remote connector.

With no connections to channel 1, position the pen to the RIGHT chart edge. Connect pin 19 of the remote connector to channel 1 analog input. Set the TIMER to "TIMER OFF".

With the chart running, there should be no timer pulses on channel one or the event pen.

Turn the TIMER ON and set for 1 SECOND. Note that the timer pulses appear on the event pen AND on channel 1 analog pen. The amplitude on channel 1 should be 4-5V NEGATIVE pulses and will pulse ONLY in the NEGATIVE direction. The event pen traces should be normal, 9 pulses to the left and one pulse to the right.

Stop the recorder and remove the pin 19 connection and the analog channel connection.

2.4.30 Remote Inputs (cont.)

Connect pin 20 of the remote connector to ground. Run the recorder and note the event pen pulses at 1 second intervals, 9 pulses to the left and 1 pulse to the right.

Short pin 21 of the remote connector to ground. The event pen should deflect LEFT as long as pin 21 is grounded, overriding the timer.

Remove the connections from pins 20 and 21.

With the recorder running, short remote pin 3 to ground. The standard right hand event marker should deflect to the left.

Open pin 3 and short remote pin 4 to ground. The standard right hand event marker should deflect to the right.

Open pin 4 of the remote conenctor.

For optional event markers, shorting the indicated remote pin to ground will deflect the marker to the left or right as stated:

OPTIONAL EVENT MARKER	PIN #	DEFLECTION
1	5	LEFT
1	6	RIGHT
2	7	LEFT
2	8	RIGHT
3	9	LEFT
3	10	RIGHT
4	11	LEFT
4	12	RIGHT
5	13	LEFT
5	14	RIGHT
6	15	LEFT
6	16	RIGHT
7	17	LEFT
7	18	RIGHT

Stop the recorder and connect a DVM to remote pin 32 and ground. With the recorder at "STOP", the DVM should read apx 5V DC.

Pull the writing table slightly ajar until the "INTERLOCK" message appears on the display. At this time the DVM should read apx 0V DC.

Remove the DVM.

2.4.31 Interface Input Connections/Writing Quality

Install the dummy interface input card. Remove any connections from the drive amplifier phone jacks.

Signal input connector - Gould Part No. 245537-37, supplied with recorder. Make input analog signal connections to pins 20 thru 27 inc. on the 37 pin interface input connector. Pin 20 is channel 1 thru pin 27 which is channel 8. Commons are pins 1 thru 11 on the same board.

Connect a function generator to the inputs and run the chart at 25 mm/sec. Set the generator for about 25 Hz F.S. sine wave and note that a signal passes to all channels.

Reduce frequency to 1 Hz and change to a triangle wave. Run the chart at about 5 mm/sec.

Check writing quality:

Traces should be dry about 1/2 way down the chart table.

2.4.32 Multiple Power Supply

Remove power from the recorder and test ONE supply at a time as follows:

Install only one 15V P.S. and apply power to the recorder. Run chart at 100mm/sec and apply a F.S. sine wave to all channels. Slowly increase frequency to 20 Hz. The recorder should have enough power to drive all channels at least 15-20 Hz F.S. with only one power supply.

Stop recorder and test each supply independently.

Re-install all power supplies and check unit at maximum frequency response to ensure all supplies function in parallel.

2.4.33 Final Set Up

Set recorder to "STOP". Ensure clock and date are set correctly. Set switches on master controller board as follows:

SW position 1 OFF = WARM START (ON = Toward PC Board)
SW position 2 OFF = REAL TIME CLOCK
SW positions 3 & 4 ON = DIVIDE BY 100.

Set switches on the SERVO board as follows:

SW position 3 ON
SW positions 1,2,4,5 & 6 OFF
This is 5V F.S. span and normal polarity of monitor output.

Remove all analog inputs and position all pens to chart center. Then "STOP" recorder and remove power.

2.4 PERFORMANCE TEST PROCEDURE

2.4.33 Final Set Up (cont.)

Wait about 2 minutes and reapply power. Verify that the time and date are still functioning. Run recorder and verify all pens are still at chart center.

STOP recorder and remove power.

If recorder has interchannel annotation heads, they should be tested using either an RS 232 or IEEE interface and addressing them directly or connecting appropriate amplifiers and checking thru the AMP PRINT mode.

2.5 MECHANICAL ADJUSTMENTS

2.5.1 Annotation Head Alignment

After replacement of the annotation head, initial adjustment prior to applying power is important to prevent damage to the head due to poor thermal contact with the paper.

The left/right location for the left edge annotation head may have to vary slightly from an initial setting due to paper tracking tolerances, especially for the 8 Ch unit where the writing area available is smaller than on the 6 Ch unit. In any case, the .120 inch characters are supposed to be written .030 inch from the left paper edge to the closest printing dot. Figure 4-9, Transport Assembly, on page 4.17 shows an exploded view of the left edge annotation assembly. To adjust left/right position of the annotation arm loosen multiple spline screw, item-5 in Fig. 4-9. Position annotation arm accordingly then tighten multiple spline screw.

Initial adjustment -- 8 Ch .... 0.120"	Measure Table edge to
Initial adjustment -- 6 Ch .... 0.170"	arm body

Annotation Head Pressure against chart is 100 grams +/- 5 grams. Measure with table closed and power off. Using a 0-150 gram gauge, lift tip without damaging writing element. Measure at 90 degree angle to the arm. The spring, item-8 in Fig. 4-9, has +/- 10 gram (step) adjustment on the end which is attached to the annotation mounting bracket, item-10 Fig. 4-9.

A one time adjustment of the annotation heat sink, item-11 Fig. 4-9, so that the writing element is parallel to the surface of the rubber roller on which it writes is required and is accomplished by twisting the square heat sink bar until the element remains parallel to the roller. Avoid damaging the writing element and flexible printed circuit cable on the under side. Adjust, by torquing the 1/4 inch square heat sink bar, item-11 Fig.4-9, so that the writing element on the annotation arm is parallel to the rubber roller on the writing table. Improper adjustment will show up as light writing at top or bottom edge of printed letters and eventual damage of the writing element from overheating. Screws, item-13 Fig. 4-9, must be tight during this adjustment.

2.5 MECHANICAL ADJUSTMENTS

2.5.2 Vertical Alignment Left Edge Annotation Head

The head is to be adjusted so that the writing element is centered on the crown (high point) of the rubber roller with respect to a plane parallel to the annotation arm. Use alignment gauge Gould Part No. CL-211327 to adjust up/down position of the annotation arm. Calibration instructions are given below for both Left Hand and optional interchannel heads.

Loosen the two screws, items-13 Fig. 4-9, which hold the heat-sink to the arm just enough to allow the heat-sink to slide up and down when the adjusting screw is rotated, item-7 Fig. 4-9. Do not loosen these screws to the point where separation between the parts could occur.

Raise the arm off the rubber covered roller, and interpose a .008"-.010" thick gauge block (about .35"wide x 1.125"long, feeler gauge) Gould Part No. CL-211327, between the head and the roller. The gauge block should be positioned to extend about .6" back beyond the cylindrically contoured ridge of the print head.

Rotate the alignment screw, item-7 Fig.4-9, top of the assembly to find the position where the gauge tool (CL-211327) is visually parallel to the bottom surface of the print-head.

From the screw orientation that yielded the above parallelism, rotate the alignment screw 1/6 turn in the direction which increases the separation between the print head wafer and the gauge block.

Remove the gauge block, and tighten the down the attachment screws, items-13 Fig. 4-9. Recheck element parallism.

2.5.3 Interchannel Annotation Head Alignment

The procedure for aligning interchannel annotation heads is the same as the procedure for aligning the the edge annotation head except that the interchannel annotation heads write on the top of the table roller instead of the front.

2.6 ELECTRICAL CALIBRATION

2.6.1 Chart Drive Board

This paragraph calibrates the Zero Offset and Gain adjustments for the paper speed VCO (Voltage Control Oscillator). Attach averaging frequency counter at TP2 (high probe) and TP6 (common).

Press 500 mm/sec and DIVIDE BY buttons.

Adjust R43 for 80,000 +/- 80 Hz.

Press 5 mm/sec button and adjust R27 for a frequency of 800 Hz +/- 0.8 Hz.

Repeat both adjustments until interaction of circuitry has been negated. Adjusting at 500 mm/sec first gives the least interaction.

2.6.1 Chart Drive Board (cont.)

Disconnect frequency counter and program event timer repetition rate for 1 second intervals. To select timing rate press the SET key, then repeatedly press the EVENT TIMER key until display reads 1 second, then press the ENTER key.

Press the 25mm/sec button, divide by function inactive. Run at least 1 meter of chart paper out the bottom of writing table.

Press front panel STOP button.

Remove chart paper and lay paper on flat surface.

With a meter stick measure the event pulses. There should be 41 pulses, counting the first and last pulse, over one meter of chart paper $\pm$2.5 mm. If a meter stick is not available the 1 mm and 1 cm grid lines printed on the chart paper may be used.

If the number of pulses over one meter of chart paper does not equal 41 than the base frequencies of 800 and 80K Hz must be changed to compensate for variation in the mechanical tolerances. If the chart is 10% fast reduce both frequencies by 10% and repeat measurement of pulses.

2.6.2 Pen Servo Board (Repeat this section for each pen)

2.6.2.1 Preset Initial Conditions (new boards only)

-- SPAN, DAMP, FREQ COMP, HEAT BAL and R-6 (SQ WAVE COMP) centered.
-- RIGHT LIMIT and LEFT LIMIT at full CCW. (25 turn controls)
-- Dip switches - # 3 "ON" (toward PC board); 1,2,4,5, and 6 "OFF".
(Monitor Polarity normal, +/- 2.5 v sensitivity)

2.6.2.2 Square Wave Comp. R-6

Prepare to calibrate R-6.
-- Insert Extender Board CL-210472 in card slot.
-- Insert Servo board in Extender.
-- Power ON, (COLD START) Provides zero penposition offset.
-- Chart speed at 5 mm/sec or slower.
-- Input signal at zero.

Adjust R-6's to center pens on channel centers. (+/- 1 div is adequate)

NOTE:

For the remaining adjustments on the servo board the Extender Board should not be used.

2.6.2 Pen Servo Board (cont.)

2.6.2.3 Span Adjust

Use pen position push button controls to exactly center the pen.

Apply +1.000 vdc to channel input via Analog Signal Input connector Gould Part No. 245537-37 or mini phone plug Gould Part No. 290144 (both supplied with recorder). Analog Input connector pin connection information is in Section II of the 3000 User's manual.

Adjust SPAN control for 10 divisions left deflection.

Recheck pen zero at chart center with zero volts applied then increase input to +2.500 vdc and fine adjust SPAN control for full scale left deflection. Adjust for +/- .2% of F.S. accuracy.

Apply + 2.500 vdc through - 2.500 vdc in steps of .500 vdc. Repeat and readjust span and zero ... Linearity must be within .35 % at all points with left deflection within 0.2%

Repeat span adjust for all channels.

2.6.2.4 Damping Adjust

Center pen using appropriate buttons and apply ± 2.0 volt, 10Hz square wave to each channel and adjust DAMPing for 1/2 div overshoot at 25 mm/sec.

2.6.2.5 Frequency Compensation Adjust

Set FREQ COMP at 25 mm/sec by sweeping from 10 Hz (full scale sine wave input) to the upper frequency limit of recorder (50 Hz 50 mm channels or 30 Hz 100 mm channels) on each channel. Adjust for less than +/- 1 div variation. Recheck damping at 80% F.S. square wave and reset FREQ COMP if necessary.

Reduce input amplitude to 10 mm and check 100 Hz sine wave response to be flat within 0.5 div. Check 125 Hz +/- 1 div response.

2.6.2.6 Limit Adjusts

Set LEFT and RIGHT electrical LIMITS using +2.7 VDC and -2.7 VDC. Adjust for 1 to 1.5 div deflection beyond channel limits -- except for L.H. 40 mm channel where the left deflection should be set at 1 mm outside the channel.

Adjust the mechanical limits for 2 to 2.5 mm overtravel on the channel extremes (Power OFF). Adjust the mechanical stops with the power off as follows:

Swing the pen to the left, loosen the right hand screw which clamps the left stop. Position the pen tip 2 to 2.5 mm outside the channel and move the stop to the pen hub and tighten the clamp screw. Similarly, repeat the operations for the right limit, using the left screw to loosen the R.H. stop. On the 80/100 mm penmotors the clamping screws are accessible without swinging the pen out of the way. Same 2.0 to 2.5 div overtravel.

2.6 ELECTRICAL CALIBRATION

2.6.2 Pen Servo Board

2.6.2.6 Limit adjusts (cont.)

NOTE:

Exceeding the penmotor limits or mis-setting the electrical or mechanical limits with the power on may result in one or more circuit breakers on the servo board opening. Breakers can be reset after removing the overload (center the pens).

2.6.2.7 Heat Comp

Refer to calibration of Pen Heat Control Board.

2.6.3 Pen Heat Control Board

Unplug thermal heat pens from Pen Heat Control Board and connect 100 Ohm DUMMY load resistor where pens were plugged into.

2.6.3.1 Heat Comp (Located on Servo Bd.)

Connect the FLOATING Inputs of the ANALOG Voltmeter across the 1ST. SIGNAL Channel DUMMY LOAD resistor. (-)INPUT to J1 PIN-2 and (+)INPUT to J1 PIN-1.

Set the CHART SPEED to 5 MM/MIN. (or LESS).

Use PEN POSITION to align the pen tip (no chart trace) with approximate CHART CENTER (+/-MM).

Adjust the MINIMUM PEN HEAT trimpot (R-18) for an ANALOG Voltmeter reading of 1 Volt +/-.05 Volts (+/-one minor division).

Apply a 1 Hz. (+/-.1 Hz.) TRIANGLE signal to the input of the 1ST. ANALOG PEN channel's DRIVE AMP. (upper input connector). Adjust the INPUT signal and the DRIVE AMP's ELECTRICAL LIMITS to cause MORE THAN FULL SCALE pen travel without hitting the MECHANICAL limits.
[Do not disturb drive amp adjustments if already calibrated.]

Reduce INPUT signal to cause between 75% to FULL SCALE with priority given to obtaining pen travel that is not hitting the MECHANICAL or ELECTRICAL LIMITS.
(75% of: 40mm = 30mm, 50mm = 37.mm, 100mm = 75mm).
(90% of: 40mm = 36mm, 50mm = 45mm, 100mm = 90mm).

Ignore the ANALOG voltmeter's D.C. voltage reading and adjust the 1ST. Drive Amp. channel HEAT COMP. trimpot (AR-40 on DRIVE AMP. board) to MINIMIZE the 1 Hz. "Wobble" of the meter to LESS than .1 Volts Peak to Peak (+/- one small division).

Remove Drive Amp. INPUT signal.

2.6.3 Pen Heat Control Board

2.6.3.1 Heat Comp (cont.)

Repeat STEPS for each ANALOG PEN channel (see Table 2-1 for respective METER CONNECTIONS, MINIMUM PEN HEAT, and Drive Amp HEAT COMP. trimpots).

Disconnect the ANALOG voltmeter.

2.6.3.2 Minimum Pen Heat Adjustment (R-43 and R-54 may not be present on newer models)

Connect the "FLOATING" inputs of the DIGITAL Volt Meter across the DUMMY LOAD of the 1ST. SIGNAL Channel. (-)INPUT to J1 PIN-2 and (+)INPUT TO J1 PIN-1).

Set CHART SPEED TO 5MM/MIN. or LESS.

Adjust the 1ST. SIGNAL channel MINIMUM PEN HEAT trimpot (R-18) for a reading of (-)1.1 Volt (+/-.03 Volts).

Repeat for ALL PEN HEAT BOARD CHANNELS. (see Table 2-1 for respective MINIMUM PEN HEAT trimpots and METER INPUTS).

2.6.3.3 Maximum Pen Heat Adjustment (R16, R28, R36 and R48 may not be present on newer models)

Connect a JUMPER (short) between JA-22 and JA-3.

Adjust the 1ST. ANALOG PEN channel "MAXIMUM PEN HEAT trimpot (R-16) for a reading of (-)10 Volts (+/-.05 Volts).

Remove JUMPER.

Repeat for the remaining channels. (see Table 2-1 for the respective METER INPUTS, JUMPER LOCATIONS, and MAXIMUM PEN HEAT trimpots).

2.6.3.4 Chart Speed Compensation

Connect the FLOATING Inputs of the DIGITAL Voltmeter across the DUMMY LOAD of the 1ST. EVENT Channel. (-)INPUT to J2 PIN-2 and (+)INPUT TO J2 PIN-1).

To save chart paper, alternate between Chart STOP and 100MM/SEC. and adjust CHART COMP. trimpot (R-10) for (-)3.5 Volts +/-.03 Volts.

2.6.3.5 Frequency Compensation

Connect the FLOATING Inputs of the DIGITAL Voltmeter across the DUMMY LOAD of the 1ST. ANALOG PEN channel. (-)INPUT to J1 PIN-2 and (+)INPUT to J1 PIN-1).

2.6.3 Pen Heat Control Board

2.6.3.5 Frequency Compensation (cont.)

Use PEN POSITION to align the pen tip (no chart trace) with approximate CHART CENTER (+/-MM).

Apply a 6 Hz. (+/-.1 Hz.) TRIANGLE signal to the input of the 1ST. ANALOG PEN channel's DRIVE AMP. (upper input connector). Adjust the INPUT signal and the DRIVE AMP's ELECTRICAL LIMITS (if required) to cause MORE THAN FULL SCALE pen travel without hitting the MECHANICAL limits.

Reduce the INPUT signal to observe pen deflection (no chart trace) between a Maximum of FULL SCALE and FULL SCALE -2MM Peak to Peak.

Adjust the 1ST. ANALOG PEN channel FREQUENCY COMP. trimpot (R-60), on the Heat Board, for a meter reading of:
(-)5.5 Volts +/-.05 Volts (for 40mm & 50mm channels) and
(-)7.1 Volts +/-.05 Volts (for 100mm channels).

Remove Drive Amp INPUT signal.

Repeat steps for each ANALOG PEN channel (see Table 2-1 for respective METER CONNECTIONS and FREQ. COMP. trimpot.

2.6.3.6 Final Setup

Set Chart Speed to STOP.

Remove all test leads and dummy loads.

Set R-1,2,3,4 to Mechanical Center.

Plug in respective heat pens.

TABLE 2-1 PEN HEAT CONTROL CALIBRATION CHART

HEAT PEN Channel	METER INPUT Conn.	HEAT COMP. Adj.	MINIMUM PEN HEAT Adj.	MAXIMUM PEN HEAT Adj.	MAXIMUM PEN HEAT ---Jumper	CHART SPEED Comp.	SIGNAL FREQ. Comp.
1ST. SIGNAL	(-) to J1-1 (+) to J1-2	(DR.AMP) AR-40	R-18	R-16	JA-3 to JA-22	R-10	R-60
1ST. EVENT	(-) to J2-1 (+) to J2-2		R-43	R-36	JC-3 to JC-22		
2ND. SIGNAL	(-) to J3-1 (+) to J3-2	(DR.AMP) BR-40	R-30	R-28	JB-3 to JB-22		R-62
2ND. EVENT	(-) to J4-1 (+) to J4-2		R-54	R-48	JD-3 to JD-22		

SECTION III

MAINTENANCE

3.1 INTRODUCTION

This section contains subassembly replacement and troubleshooting instructions for the Gould RS 3200 and RS 3400 thermal recorders. For replacement information on materials regularly consumed in operation refer to the maintenance section in the 3000 User's manual.

3.2 SUBASSEMBLY REPLACEMENT

WARNING:

MAKE SURE POWER SWITCH IS TURN OFF AND RECORDER IS DISCONNECTED FROM POWER SOURCE BEFORE DISASSEMBLY.

3.2.1 Carrying Case

Refer to Figure 4-5 in the illustrated parts breakdown section of this manual.

The top and the side covers of the carrying case are removable allowing access to certain areas on the recorder. The top of the carrying case is held on by either (4) screws, item-2 or by (4) clip springs located approximately in the same area as the screws are shown. To remove top cover held on by clip springs, grasp "U" shaped cover, item-1, near the top middle of both sides with the palms of your hands. While applying enough inward pressure to prevent hands from slipping, lift top cover straight up. Remove the side cover, located below the handle, by unscrewing the (3) screws, item-15, and sliding cover, item-14, down. Suggested method for removing side cover is to position recorder on work bench so that the side which is to be removed extends beyond the table top allowing access to screws.

To remove the recorder from its carrying case remove the (4) front panel screws, (8) bottom screws and (2) rear screw which secure recorder into carrying case. Recorder slides out the front of the carrying case as depicted in Figure 4-1.

3.2.2 Separating Card Cage, Transport and Signal Conditioner Enclosure

Refer to Figure 4-6 in the illustrated parts breakdown section of this manual unless otherwise noted.

Remove recorder from carrying case in portable systems or saddle in rack mounted systems.

To detach the signal conditioner enclosure remove the two screws, on the top, which hold the enclosure, item-13, to the rear panel. Next remove the screw, item-6 Figure 4-15, which holds the bottom of enclosure, item-13, to card cage, item-9, (earlier versions of enclosure do not have access hole in opposite side of enclosure, but can be removed from underside by tilting recorder on left side). Remove (2) nut assemblies, item-19, which sercure enclosure to front panel, item-18, (RS 3400 nut is on outside of enclosure, RS 3200 nut is on inside of enclosure).

3.2.2 Separating Card Cage, Transport and Signal Conditioner Enclosure (cont.)

The screws in the ejector assemblies, item-17, must be completely unscrewed and ejectors lifted over front panel while removing enclosure. Unplug flat cable, item-12, complete separation.

To detach the card cage from the transport remove the (3) screws, item-10, from each side. Unplug the flat cable which comes from the front panel board and connects to the tops of the mother-in-law and the mother boards. Unplug the stepper motor connector from the bottom of the mother board. Separate the card cage from the transport far enough to allow access to the penmotor connectors. Unplug the penmotor cables, item-8, from the penmotors and the cable, item-11, which is connected to the bottoms of the mother and the mother-in-law boards.

3.2.3 PC Board Replacement

Most of the electronic circuitry is contained on the PC boards plugged into the card cage. To remove any one of the PC boards the rear panel must be removed. The recorder does not have to be removed from its carrying case but the top cover must be removed so that the (4) screws on the top of the rear cover can be removed. Also remove the (4) screws on the back of the rear panel. Refer to Figure 4-16 for rear panel removal illustration and PC board orientation.

The paper out sensor board, speed monitor board, mother-in-law board, chart supply board, keyboard and optional interchannel annotation driver board are all PC boards which perform functions remote to the card cage.

The paper out sensor board is mounted below penmotor Ch. 1 inside the chart supply compartment; refer to Figure 4-8 item-30. To remove paper out sensor board remove screw, item-31, and unplug board from cable connector.

The speed monitor board is also depicted in Figure 4-8, item-46. To remove speed monitor board unscrew item-47 while holding nut, item-48 with a wrench.

The chart supply sensor board is illustrated in figure 4-10 item 5. Item-3 the guide assembly must be removed before chart supply board is removed.

The mother-in-law board is attached to the pen bar assembly and requires the separation of the card cage from the transport before mounted screws, depicted in Figure 4-11 item-6, can be removed.

To remove the keyboard PC board from the control panel assembly, Figure 4-14, unscrew the (10) screws item-4 which holds assembly together. Unplug flat cable from connectors on top of the mother-in-law board and the mother board.

NOTE:

The flat cable is attached to the keyboard PC board and does not unplug.

The optional interchannel annotation driver board is located below the ink plunger and cartridge assemblies on the top side of the pen bar above the transport. The driver board plugs into the bottom row of connectors on the mother-in-law board. Before removing driver board unplug annotation heads which plug into socket on driver board.

3.2.3 PC Board Replacement (cont.)

To remove the mother board separate the card cage from the transport. Remove the (8) screws which retain the mother board support assembly to card cage, refer to Figure 4-17 items-2 and -15. After support assembly has been removed the mother board can be separated from the support bars by removing the screws, item-6, which attach mother board, spacer and shield to support bars. During installation of mother board do not completely tighten screws, item 6, until support assembly has been installed into card cage; at that point align connectors on the mother board with PC card guides and tighten screws, item-6.

3.2.4 Writing Table

Refer to Figure 4-12 in the illustrated parts breakdown section of this manual.

To remove writing table assembly, fully open writing table. Grasp the pull bar, item-13, in your left hand. Flex the right support link, item-3, far enough away from writing table to allow the pivot screw cap, item-9, to slip out of hole in support link. The writing table should now fall out of the recorder.

3.2.5 Front Panel

Refer to Figure 4-6 in the illustrated parts breakdown section of this manual.

To remove front panel assembly remove carrying case cover in portable systems or extend recorder on its slide in rack mounted systems. Unplug the flat cable which is connected to the front panel, from connectors on the top of the mother-in-law and the mother boards. Detach latch, item-2, by removing the screw, item-3, which attaches latch to front panel (latch is located on left side RS 3400 and right side RS 3200). Remove the pivot screws, item-6, from each side and feed flat cable through notch in panel bezel assembly, item-18, while pulling front panel assembly away from recorder.

3.2.6 Penmotor

Refer to Figure 4-11 in the illustrated parts breakdown section of this manual.

Each penmotor is held in place by (2) screws, item-24 which retain penmotor from the top. To gain access to the penmotor screws the ink manifold, item-26, may have to be moved out of the way. Ink tubes do not have to be removed from manifold in order to move manifold, but ink pen tube which is attached to penmotor being replaced must be removed. Turn ink value OFF before removing ink pen (ink valve is located above manifold stem to which ink tube is connected) by rotating value CCW until mechanical stop is reached. Remove (2) screws, item-27, which hold manifold to pen bar. Gently move manifold out of the way and remove penmotor screws, item-27, while holding onto penmotor with free hand. Unplug penmotor cable and remove penmotor.

3.3 TROUBLESHOOTING

3.3.1 Introduction

This section provides troubleshooting hints to assist the service person in locating possible malfunction and their remedy.

3.3.2 Electrical Power

MALFUNCTION	POSSIBLE CAUSE	REMEDY
1. Recorder inoperative (Display blank and fan not running)	a. Recorder not connected to power source.	a. Connect to power source.
	b. Main fuse blown.	b. Replace fuse.

3.3.3 Chart Drive Malfunction

MALFUNCTION	POSSIBLE CAUSE	REMEDY
1. Display reads 'INTERLOCK'	a. Paper loaded wrong or supply roll empty.	a. Check supply roll, refer to User's manual for proper loading.
	b. Open table sensor item-16 Fig.4-8 misaligned.	b. Reposition sensor so that its focal point is the closed writing table thru hole in side plate.
	c. Paper out sensor bd. item-30 Fig. 4-9 malfunctioning or out of focus.	c. Loosen mounting screw item-31 and position bd. so sensor is located above paper travel.

3.3.3 Chart Drive Malfunction (cont.)

MALFUNCTION	POSSIBLE CAUSE	REMEDY
2. Display reads 'STOP MOTOR STALLED'	a. Speed monitor bd. item-46 Fig. 4-8 malfunction or timing disk item-45 Fig. 4-8 not traveling thru 'U' shaped sensor on speed monitor board.	a. Reposition speed monitor bd. bend mounting bracket if side plate is equipped with bracket (metal side plates do not have bracket)
	b. Drive belt broken.	b. Replace belt.
	c. Fuse on chart drive bd. blown.	c. Replace fuse.
	d. Stepper motor shaft turning but pulley is not.	d. Tighten set screw in pulley.
	e. Timing disk came off metal disk.	e. Glue timing disk back on to medal disk.
	f. Chart take-up drive gear not meshing properly.	f. Remove side cover on drive arm and adjust eccentric cam to lessen pressure.

3.3.4 Signal Malfunction

MALFUNCTION	POSSIBLE CAUSE	REMEDY
1. Trace unusually wide.	a. Noise appearing on pen tip.	a. Check input signal and cable connections. Determine if fault is on servo bd. or within penmotor by exchanging servo bds. and penmotor cables; repair or replace (unplug cables item-8 Fig. 4-6, at the penmotor).
2. No signal	a. Defective Servo bd. or penmotor.	a. Follow same remedy as Trace Unusually Wide.
	b. Signal conditioner defective.	b. Repair or replace.

3.3.4 Signal Malfunction (cont.)

MALFUNCTION	POSSIBLE CAUSE	REMEDY
3. Pens limp or biased	a. Servo out of calibration.	a. Calibrate servo bd.
	b. Defective servo bd. or signal conditioner.	b. Repair or replace.
	c. Loose pen.	c. Align and tighten pen.
	d. Loose penmotor band.	d. Tighten band tension 7.0 to 8.0 pounds using spring scale.

SECTION IV

PARTS IDENTIFICATION

4.1 INTRODUCTION

The following parts lists and schematic diagrams in Appendix A are included to assist in service and repair of the RS 3200 and RS 3400 thermal recorders. For replacement parts locate component in the appropriate figure, then refer to the Parts List which is pertinent to that figure.

To assure prompt and satisfactory delivery of replacement parts, include the following information with your purchase order:

1. Name, model number, and serial number of the recorder.

   Example: RS 3400

   Model: 30-V8404-10
   Serial No: xxx

2. Description of the part as listed in manual.

3. Gould part number.

NOTE:

Do not use the symbol number from the parts list or the schematic to identify the desired parts on your order.

4.2 ATTACHING PARTS (A-P)

Attaching hardware is designated by an (A-P) after the line item it attaches to and continues until the line shown as -------- * --------. Unillustrated hardware is listed as an Attaching Part.

4.3 ASTERISK

Part numbers preceded by an asterisk * are not procurable.

4.4 USED ON CODE

The USED ON column identifies the recorder assembly for which that part is unique. If an on code letter is not present, that part is common to all recorders described in this manual. The used on codes are listed below.

LETTER CODE	RECORDER MODEL NO.
K	30-V8404-1X
L	30-V8420-1X
M	30-V8412-1X

LETTER CODE	RECORDER MODEL NO.
N	30-V8202-1X
P	30-V8210-1X

4.5 COMPONENT ORIENTATION

The corner mark placed inside some electronic components on PC board breakdowns indicates one of the following conditions to be true:

(1) cathode end of diode
(2) positive polarity of capacitor
(3) pin 1 of I.C.

```
**********************************************************************
*                                                                    *
*  THE PARTS LIST CONTAINED IN THIS MANUAL REFLECTS INFORMATION      *
*  IN EFFECT AT THE TIME OF ITS PUBLICATION.  THIS INFORMATION       *
*  IS INTENDED AS AN AID TO IDENTIFICATION AND SERVICING.            *
*  CERTAIN PARTS AND ASSEMBLIES MAY NOT BE AVAILABLE FOR SALE.       *
*  ITEMS ARE SUBJECT TO CHANGE AND GOULD INC RESERVES THE RIGHT      *
*  TO MAKE CHANGES WITHOUT NOTICE.                                   *
*                                                                    *
**********************************************************************
```

RS 3400 & RS 3200 THERMAL RECORDER
PORTABLE RECORDING SYSTEM
FIGURE 4-1

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	30-V8404-10	Recording System, Thermal, 4-50 mm, Portable (RS 3400)	K
	30-V8420-10	Recording System, Thermal, 2-100 mm, Portable (RS 3400)	L
	30-V8412-10	Recording System, Thermal, 2-50 mm, 1-100 mm, Portable (RS 3400)	M
	30-V8202-10	Recording System, Thermal, 2-50 mm, Portable (RS 3200)	N
	30-V8210-10	Recording System, Thermal, 1-100 mm, Portable (RS 3200)	P
1	30-V8404-00	Recorder, Thermal, 4-50 mm (RS 3400) (See Fig. 4-6)	K
	30-V8420-00	Recorder, Thermal, 2-100 mm (RS 3400) (See Fig. 4-6)	L
	30-V8412-00	Recorder, Thermal, 2-50 mm, 1-100 mm (RS 3400) (See Fig. 4-6)	M
1	30-V8202-00	Recorder, Thermal, 2-50 mm (RS 3200) (See Fig. 4-6)	N
	30-V8210-00	Recorder, Thermal, 1-100 mm (RS 3200) (See Fig. 4-6)	P
2	CL-811054	Enclosure Assy., Portable (RS 3400) (See Fig. 4-5)	KLM
2	CL-811055	Enclosure Assy., Portable (RS 3200) (See Fig. 4-5)	NP
3	CL-210430-0218	Screw, Panel, Pan Hd., 10-32 x 1-1/8 In. w/Nylon Washer (A-P)	
	13-262716-8206	Screw, Pan Hd., 8-32 x 3/8 In. (Not Shown)	

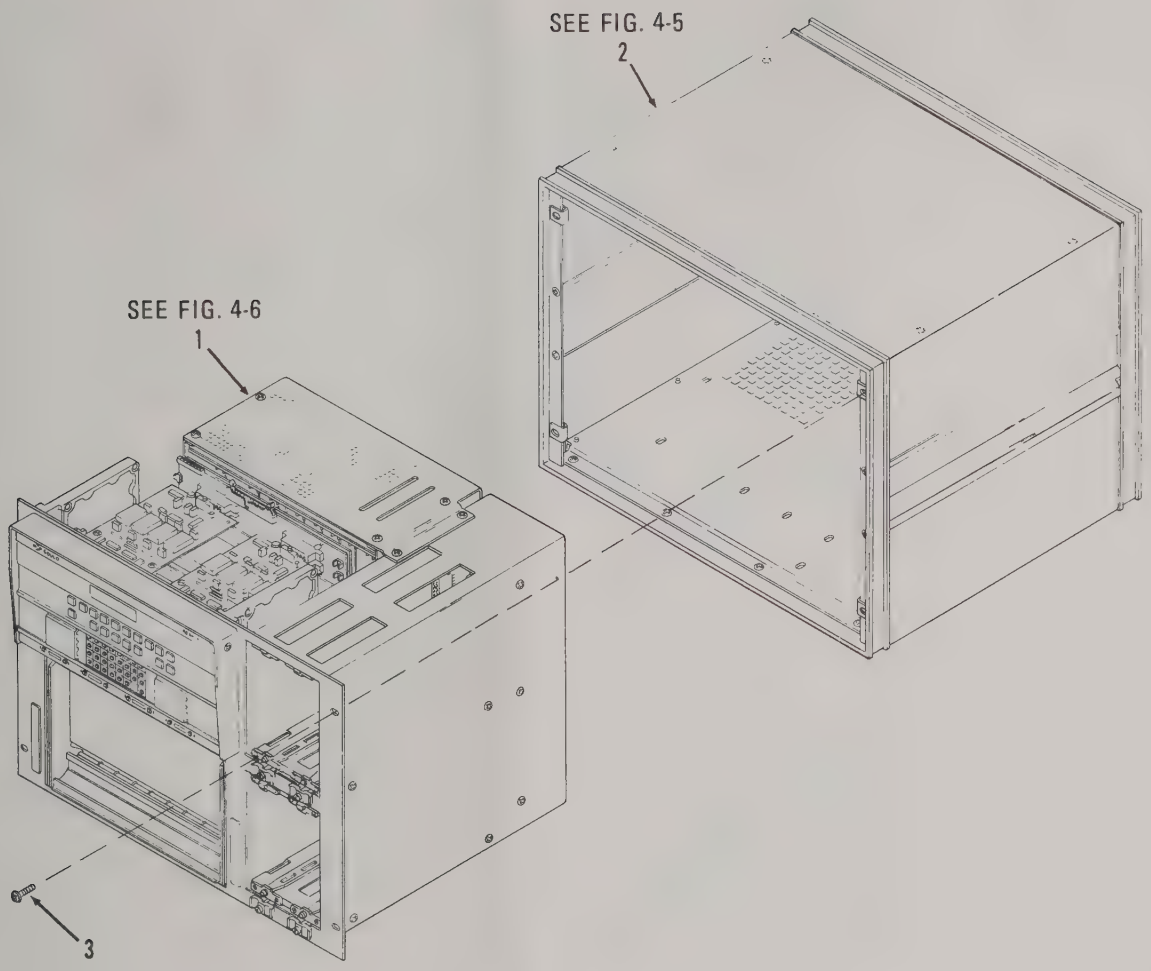


FIGURE 4-1 PORTABLE RS 3400 SERIES RECORDER

RS 3400 & RS 3200 THERMAL RECORDER
RACK MOUNTED RECORDING SYSTEM (RS 3400)
FIGURE 4-2

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	30-V8404-11	Recording System, Thermal, 4-50 mm, Rack Mounted (RS 3400)	K
	30-V8420-11	Recording System, Thermal, 2-100 mm, Rack Mounted (RS 3400)	L
	30-V8412-11	Recording System, Thermal, 2-50 mm, 1-100 mm, Rack Mounted (RS 3400)	M
1	30-V8404-00	Recorder Assy., Thermal, 4-50 mm (RS 3400) (See Fig. 4-6)	K
	30-V8420-00	Recorder Assy., Thermal, 2-100 mm (RS 3400) (See Fig. 4-6)	L
	30-V8412-00	Recorder Assy., Thermal, 2-50 mm, 1-100 mm (RS 3400) (See Fig. 4-6)	M
2	11-1202-39	Kit Assy., Rack Mount (RS 3400) (See Fig. 4-4)	KLM
3	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	

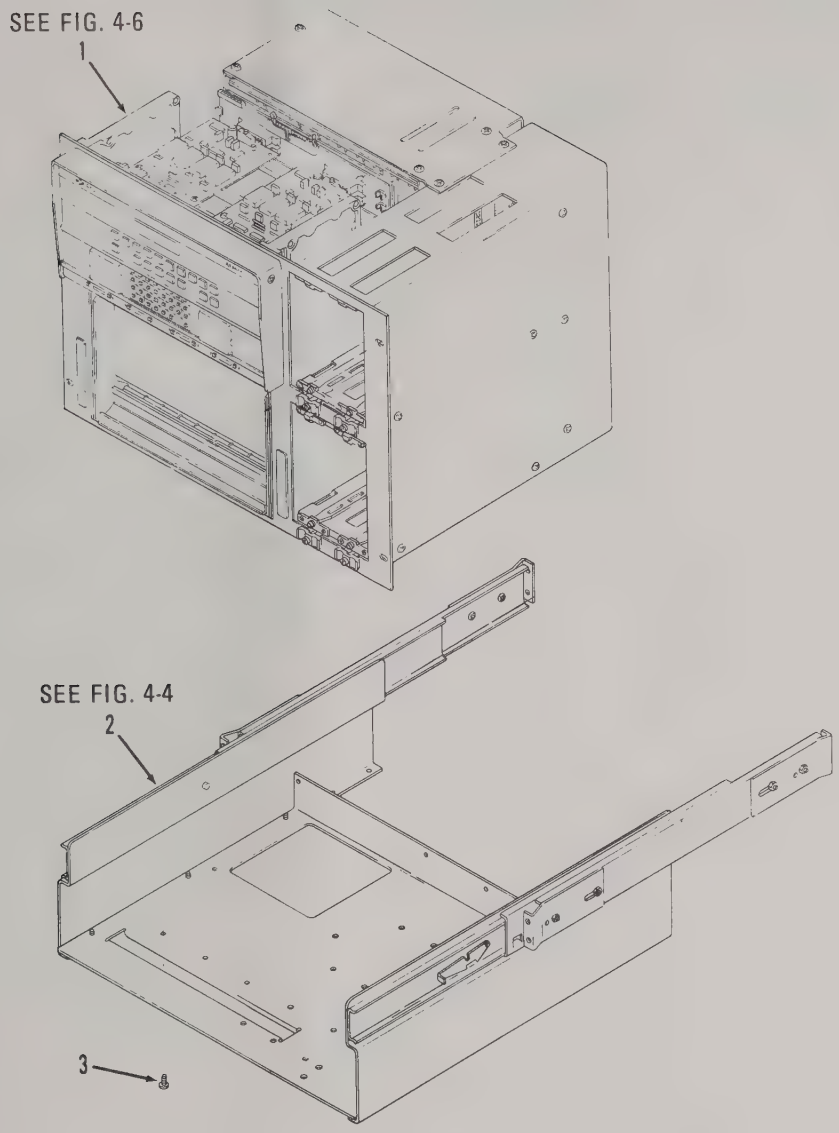


FIGURE 4-2 RACK MOUNTED RS 3400 SERIES RECORDER

RS 3400 & RS 3200 THERMAL RECORDER
RACK MOUNTED RECORDING SYSTEM (RS 3200)
FIGURE 4-3

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	30-V8202-11	Recording System, Thermal, 2-50 mm, Rack Mounted (RS 3200)	N
	30-V8210-11	Recording System, Thermal, 1-100 mm, Rack Mounted (RS 3200)	P
1	30-V8202-00	Recorder Assy., Thermal, 2-50 mm (RS 3200) (See Fig. 4-6)	N
	30-V8210-00	Recorder Assy., Thermal, 1-100 mm (RS 3200) (See Fig. 4-4)	P
2	11-1202-40	Kit Assy., Rack Mounting (RS 3200) (See Fig. 4-4)	NP
3	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	

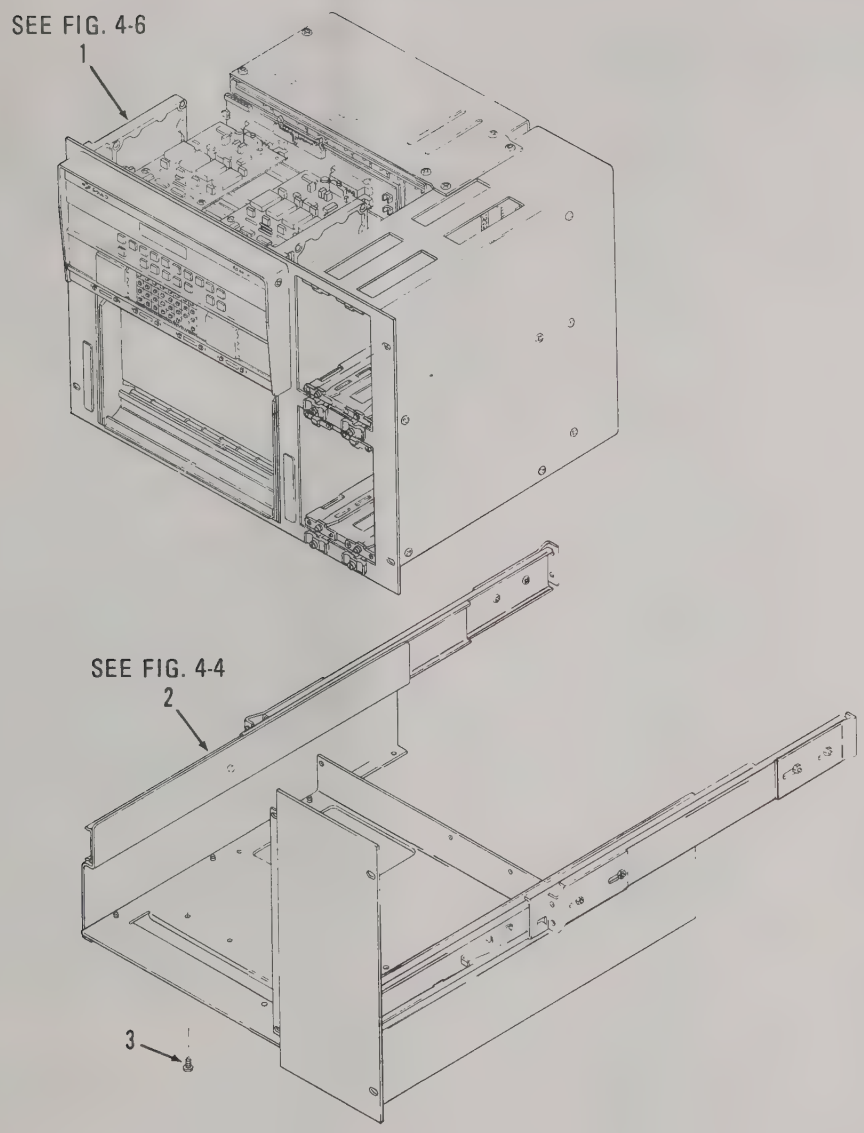


FIGURE 4-3 RACK MOUNTED RS 3200 SERIES RECORDER

RS 3400 & RS 3200 THERMAL RECORDER
RECORDER RACK MOUNTING ASSEMBLY
FIGURE 4-4

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	30-V8404-11	Recording System, Thermal, 4-50 mm, Rack Mount (RS 3400)	K
	30-V8420-11	Recording System, Thermal, 2-100 mm, Rack Mount (RS 3400)	L
	30-V8412-11	Recording System, Thermal, 2-50 mm, 1-100 mm, Rack Mount (RS 3400)	M
	30-V8202-11	Recording System, Thermal, 2-50 mm, Rack Mount (RS 3200)	N
	30-V8210-11	Recording System, Thermal, 1-100 mm, Rack Mount (RS 3200)	P
1	30-V8404-00	Recorder, Thermal, 4-50 mm (RS 3400) (See Fig. 4-6)	K
	30-V8420-00	Recorder, Thermal, 2-100 mm (RS 3400) (See Fig. 4-6)	L
	30-V8412-00	Recorder, Thermal, 2-50 mm, 1-100 mm (RS 3400) (See Fig. 4-6)	M
1	30-V8202-00	Recorder, Thermal, 2-50 mm (RS 3200) (See Fig. 4-6)	N
	30-V8210-00	Recorder, Thermal, 1-100 mm (RS 3200) (See Fig. 4-6)	P
	11-1202-39	Kit Assy., Rack Mounting (RS 3400)	KLM
	11-1202-40	Kit Assy., Rack Mounting (RS 3200)	NP
2	CL-210430-0218	Screw, Panel, Pan Hd., 10-32 X 1-1/8 In. w/Nylon Washer (A-P)	
3	CL-710949	Panel Assy., Filler (RS 3200)	NP
4	CL-310950	Bracket, Filler (RS 3200)	NP
5	243898-02	Nut, Assembled Lockwasher, No. 10-32	NP
6	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
7	249961	Spacer, 0.160 In. Thk, 0.250 In. ID x 1/2 In. OD	
8	1-261111-10	Retainer, Screw	
9	245244-02	Nut, Floating	
10	CL-711761	Plate, Shipping	
11	13-262716-0206	Screw, Self-Tapping, Pan Hd., 10-32 x 3/8 In.	
12	CL-811717-1	Slide Assy., Right	
13	13-262716-0206	Screw, Self-Tapping, Pan Hd., 10-32 x 3/8 In.	
14	1-118195-309	Washer, Plain, No. 10	
15	10-120053-106	Lockwasher, Ext. Tooth, 1/4 In.	
16	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
17	CL-811718	Slide Assy., Left	
18	CL-410807	Saddle	

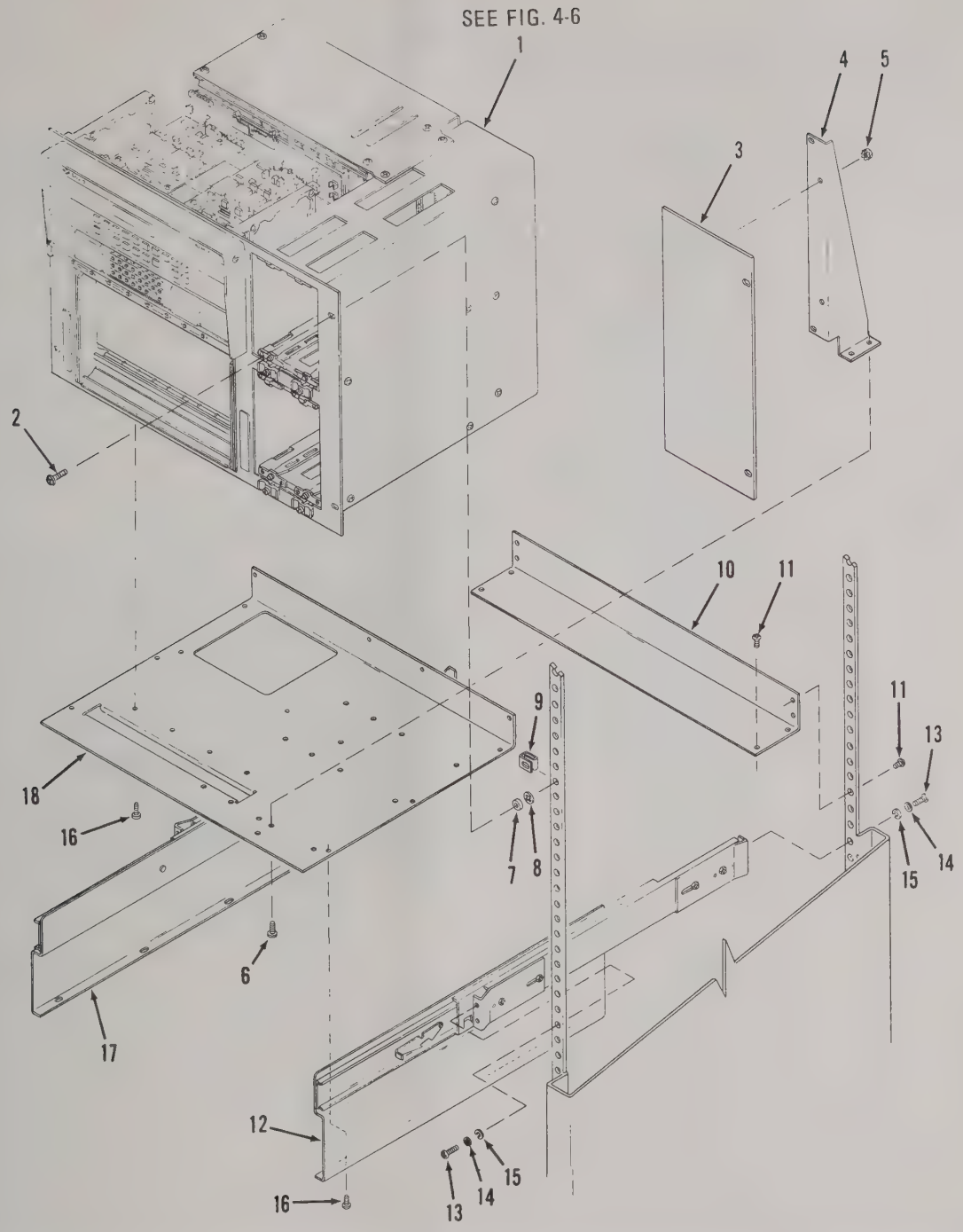


FIGURE 4-4 RS 3400 & RS 3200 SERIES RECORDER RACK MOUNTING ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
PORTABLE ENCLOSURE ASSEMBLY
FIGURE 4-5

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-811054	Enclosure Assy., Portable (RS 3400)	KLM
	CL-811055	Enclosure Assy., Portable (RS 3200)	NP
1	CL-411990	Cover (RS 3400)	KLM
1	Cl-412044	Cover (RS 3200)	NP
2	16-249616-8208	Screw, Machine, Pan Hd., Painted, 8-32 x 1/2 In.	
3	CL-811996	Brace Assy.	
4	13-262715-8206	Screw, Self-Tapping, Flat Hd., 8-32 x 3/8 In.	
5	CL-311192	Support (RS 3400)	KLM
6	31-119918-0208	Screw, Pan Hd., 10-32 x 1/2 In.	KLM
7	230820-2	Plastic, Open-Cell, Adhesive	
8	CL-411995	Plate, Back (RS 3400)	KLM
8	CL-312041	Plate, Back (RS 3200)	NP
9	31-119918-0208	Screw, Pan Hd., 10-32 x 1/2 In.	
10	245244-02	Nut, Floating	
11	CL-811038	Bezel Assy. (RS 3400)	KLM
11	CL-811067	Bezel Assy. (RS 3200)	NP
12	CL-811053	Handle	
13	13-262715-0212	Screw, Self-Tapping, Flat Hd., 10-32 x 3/4 In.	
14	CL-411051	Cover, Side	
15	13-262716-8204	Screw, Self-Tapping, Pan Hd., 8-32 x 1/4 In.	
16	266107-2	Bail Assy. (Feet)	
17	13-262716-6206	Screw, Self-Tapping, Pan Hd., 6-32 x 3/8 In.	
18	CL-411039	Base (RS 3400)	KLM
18	CL-411059	Base (RS 3200)	NP
19	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	

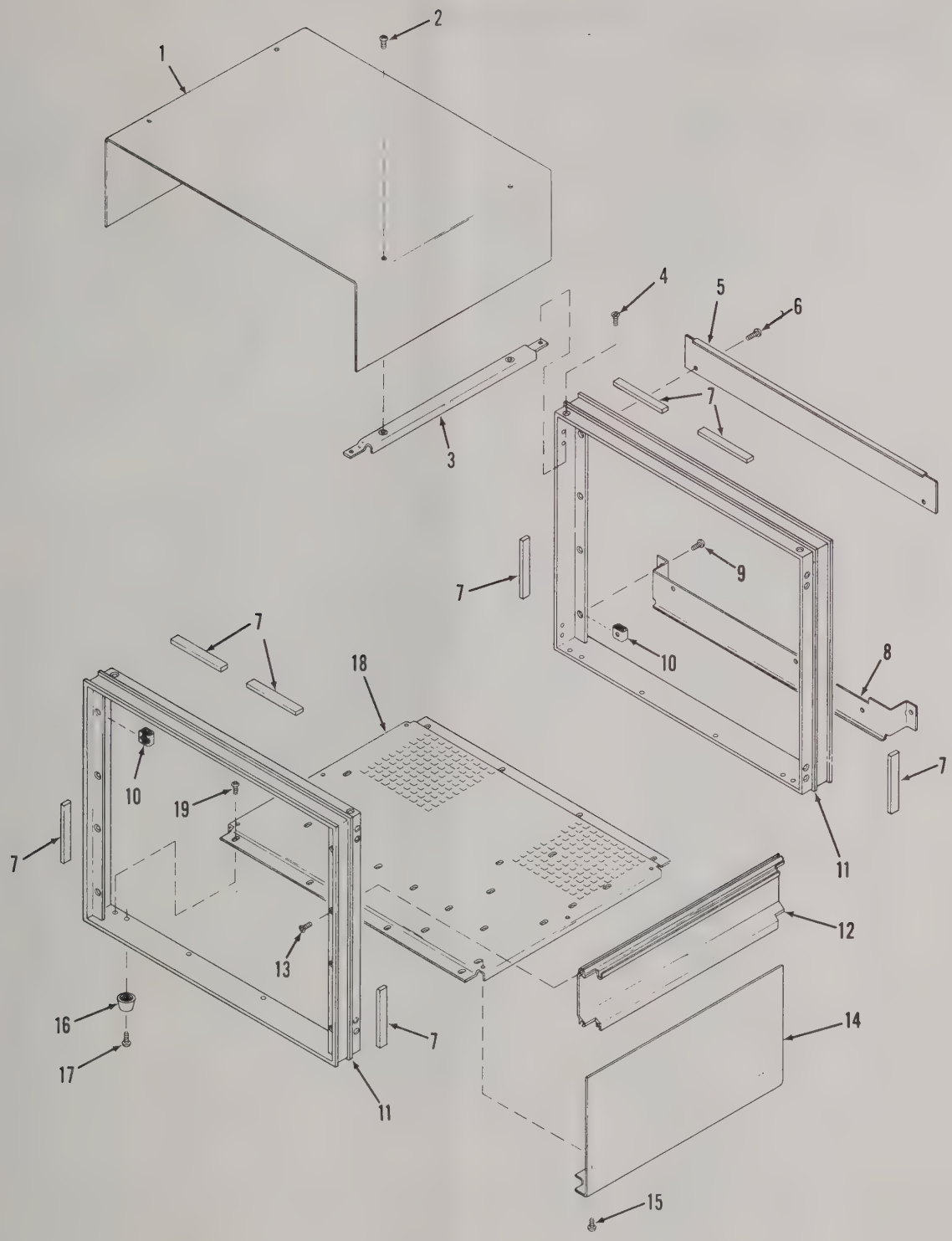


FIGURE 4-5 PORTABLE ENCLOSURE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
RECORDER ASSEMBLY
FIGURE 4-6

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	30-V8404-00	Recorder, Thermal, 4-50 mm (RS 3400)	K
	30-V8420-00	Recorder, Thermal, 2-100 mm (RS 3400)	L
	30-V8412-00	Recorder, Thermal, 2-50 mm, 1-100 mm (RS 3400)	M
	30-V8202-00	Recorder, Thermal, 2-50 mm (RS 3200)	N
	30-V8210-00	Recorder, Thermal, 1-100 mm (RS 3200)	P
1	CL-810780	Control Panel Assy., 4-50 mm (RS 3400) (See Fig. 4-15)	K
1	CL-810924	Control Panel Assy., 2-100 mm (RS 3400) (See Fig. 4-15)	L
1	CL-810923	Control Panel Assy., 2-50 mm, 1-100 mm (RS 3400) (See Fig. 4-15)	M
1	CL-810781	Control Panel Assy., 2-50 mm (RS 3200) (See Fig. 4-15)	N
1	CL-810925	Control Panel Assy., 1-100 mm (RS 3200) (See Fig. 4-15)	P
2	CL-211573	Latch	
3	13-262715-6206	Screw, Self-Tapping, Flat Hd., 6-32 x 3/8 In.	
4	CL-211572	Nut, Pivot	
5	CL-210538	Bushing, Pivot	
6	13-262715-6210	Screw, Self-Tapping, Flat Hd., 6-32 x 5/8 In.	
7	Not Procurable	Transport and Pen Bar Assy. (See Fig. 4-7)	
8	CL-610559	Cable Assy., Penmotor	
9	Not Procurable	PC Board and Card Cage Assy. (See Figs. 4-17 and 4-18)	
10	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
11	CL-710520-1	Cable Assy., Flat	
12	CL-710731-1	Cable, Flat	
13	CL-811646	Enclosure Assy. (RS 3400) (See Fig. 4-16)	KLM
13	CL-811643	Enclosure Assy. (RS 3200) (See Fig. 4-16)	NP
14	398035	Nut, Channel	
15	243898-82	Nut, Assembled Lockwasher, No. 8-32	
16	13-262715-8212	Screw, Self-Tapping, Flat Hd., 8-32 x 3/4 In.	
17	CL-610820	Ejector Assy.	
18	CL-710826	Front Panel & Bezel Assy. (RS 3400) (See Fig. 4-14)	KLM
18	CL-710827	Front Panel & Bezel Assy. (RS 3200) (See Fig. 4-14)	NP
19	243898-02	Nut, Assembled Lockwasher, No. 10-32	

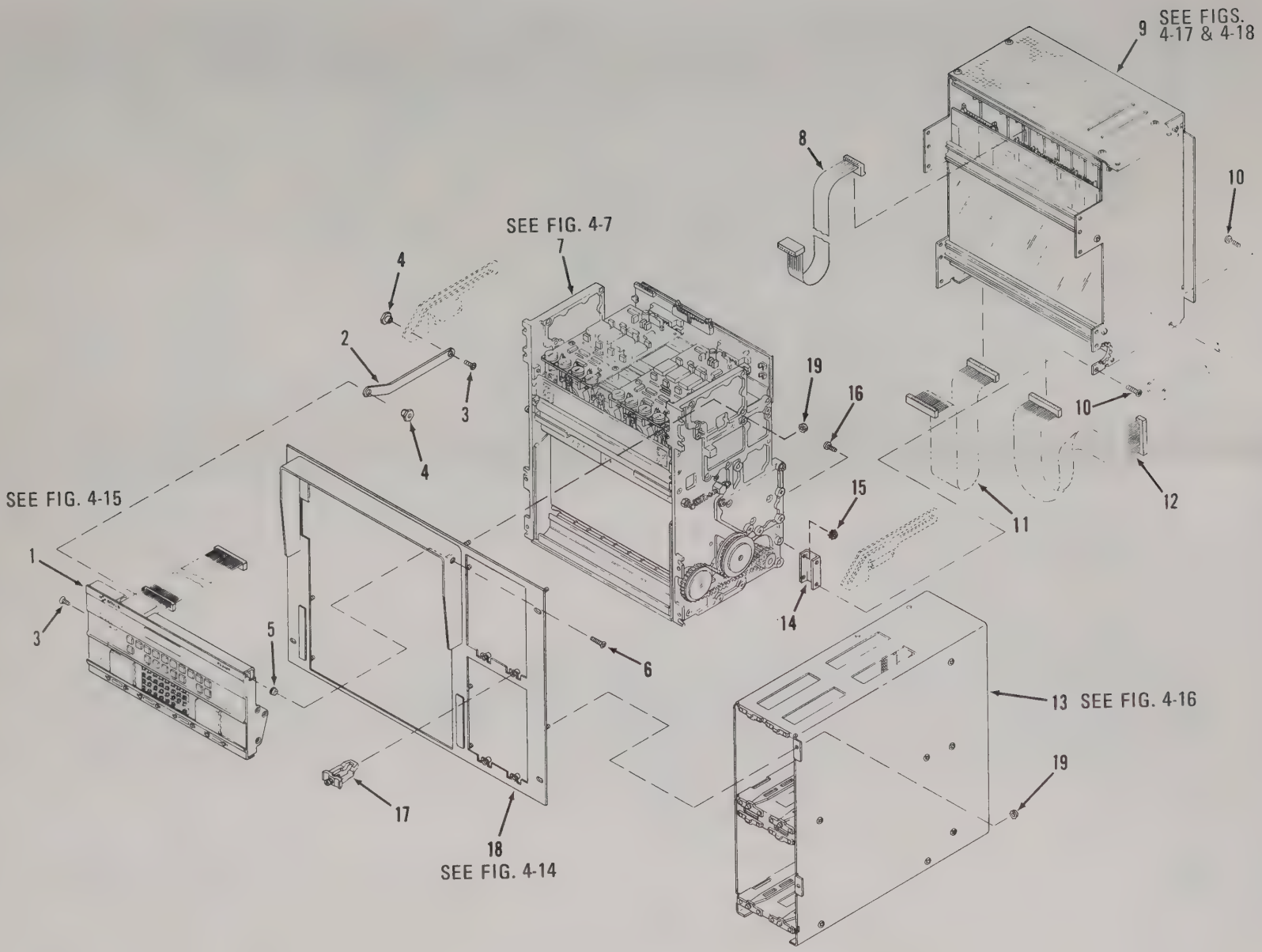


FIGURE 4-6 RECORDER ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
TRANSPORT, PEN BAR AND WRITING TABLE ASSEMBLY
FIGURE 4-7

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	Not Procurable	Transport and Pen Bar Assy., 4-50 mm (RS 3400)	K
	Not Procurable	Transport and Pen Bar Assy., 2-100 mm (RS 3400)	L
	Not Procurable	Transport and Pen Bar Assy., 2-50 mm, 1-100 mm (RS 3400)	M
	Not Procurable	Transport and Pen Bar Assy., 2-50 mm (RS 3200)	N
	Not Procurable	Transport and Pen Bar Assy., 1-100 mm (RS 3200)	P
1	CL-710552	Pen Assy., Thermal, 40/50 mm (4 Required) (Replacement Pen Kit 11-2824-3A)	K
1	CL-710552	Pen Assy., Thermal, 40/50 mm (2 Required) (Replacement Pen Kit 11-2824-3A)	MN
1	CL-710553	Pen Assy., Thermal, 80/100 mm (2 Required) (Replacement Pen Kit 11-2824-4A)	L
1	CL-710553	Pen Assy., Thermal, 80/100 mm (1 Required) (Replacement Pen Kit 11-2824-4A)	MP
2	31-119917-0005	Screw, Machine, Fillister Hd., 0-80 x 5/16 In.	
3	CL-211269	Clamp, Pen	
4	285266-1	Spacer	
5	*CL-810819	Pen Bar Assy., Thermal (See Fig. 4-11)	K
5	*CL-810819-2	Pen Bar Assy., Thermal (See Fig. 4-11)	L
5	*CL-810819-1	Pen Bar Assy., Thermal (See Fig. 4-11)	M
5	*CL-810822	Pen Bar Assy., Thermal (See Fig. 4-11)	N
5	*CL-810822-1	Pen Bar Assy., Thermal (See Fig. 4-11)	P
6	13-262715-8214	Screw, Self-Tapping, Flat Hd., 6-32 x 5/8 In.	
7	13-262716-8214	Screw, Self-Tapping, Pan Hd., 6-32 x 5/8 In.	
8	CL-811658	Transport Assy., Thermal (RS 3400) (See Fig. 4-8)	KLM
8	CL-811659	Transport Assy., Thermal (RS 3200) (See Fig. 4-8)	NP
9	297732-2	Rod, Tension (RS 3400)	KLM
9	297732-3	Rod, Tension (RS 3200)	NP
10	240704-2	Nut, Self-Locking	
11	297739	Stud, Spring	
12	2-240031-21	Spring, Extension	
13	397740	Stud, Rod	
14	Not Procurable	Fan Fold Paper Tray Assy. (RS 3400) (See Fig. 4-13)	KLM
14	Not Procurable	Fan Fold Paper Tray Assy. (RS 3200) (See Fig. 4-13)	NP
15	13-262715-8212	Screw, Self-Tapping, Flat Hd., 8-32 x 3/4 In.	
16	CL-710420-2	Pen Guard (RS 3400)	KLM
16	CL-710420-3	Pen Guard (RS 3200)	NP
17	CL-810536-2	Table Assy., Writing (RS 3400) (See Fig. 4-12)	KLM
17	CL-810536-3	Table Assy., Writing (RS 3200) (See Fig. 4-12)	NP
18	CL-210327	Screw, Dog, Eccentric	
19	CL-210330	Nut	
20	CL-710359	Plug Assy., Core, Right	
21	397737	Plug Core, Left	
22	CL-611661-2	Plug Support Assy. (RS 3400)	KLM
22	CL-611661-3	Plug Support Assy. (RS 3200)	NP

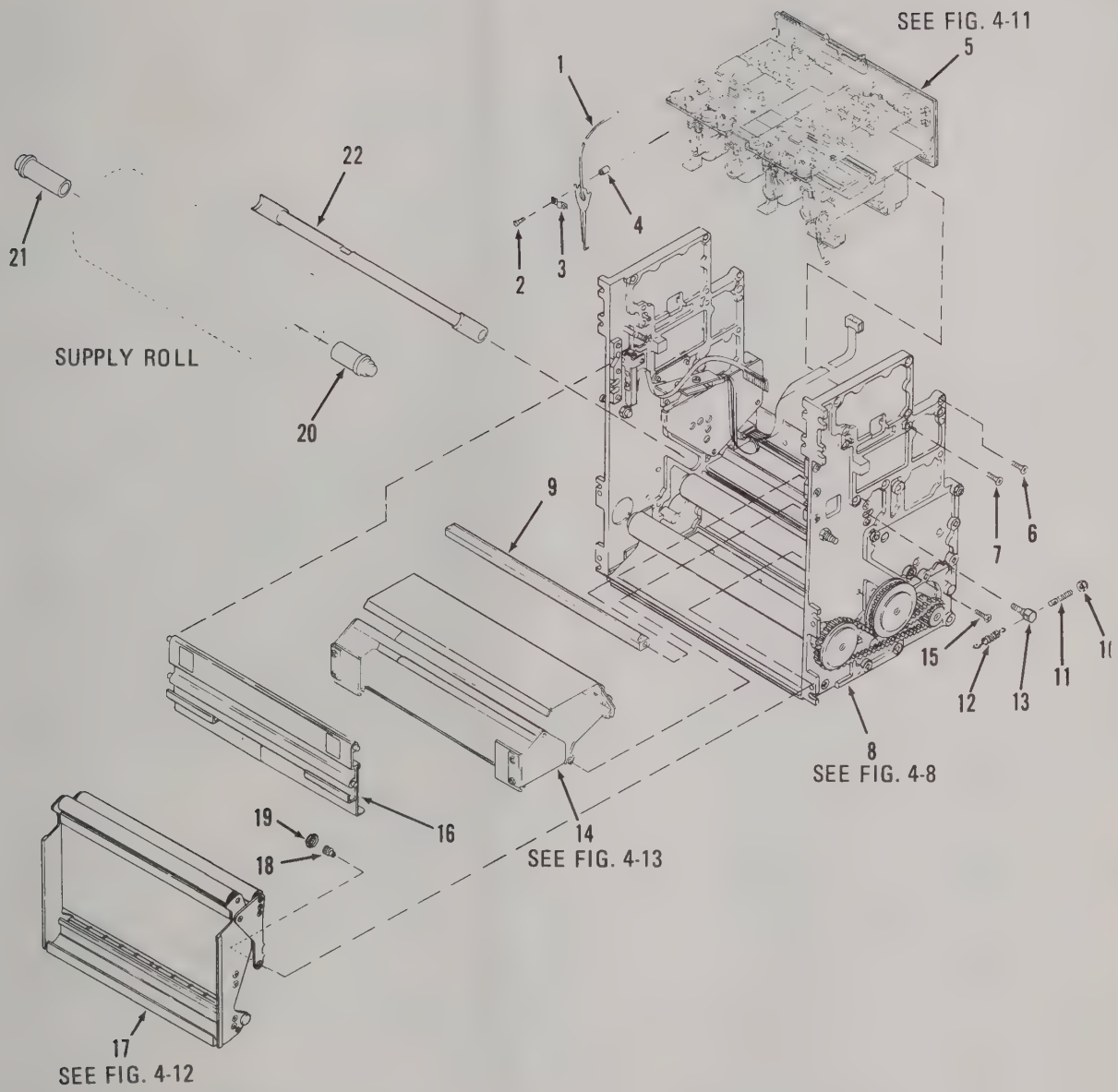


FIGURE 4-7 TRANSPORT, PEN BAR AND WRITING TABLE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
TRANSPORT ASSEMBLY
FIGURE 4-8

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	*CL-811658	Transport Assy. (RS 3400)	KLM
	*CL-811659	Transport Assy. (RS 3200)	NP
1	CL-310524	Wing, Left (RS 3400)	KLM
2	CL-310916	Bracket, Sensor	
3	13-262716-8214	Screw, Self-Tapping, Pan Hd., 8-32 x 7/8 In.	
4	CL-610338	Cable Assy., Monitor	
	*CL-711716	Annotation Assy., Left	
5	31-121166-2602	Screw, Set, Socket Hd., Cup Point, 2-56 x 1/8	
6	1-264521-16	Spring	
7	31-119922-2610	Screw, Cap, Socket Hd., 2-56 x 5/8 In.	
8	1-240031-20	Spring, Extension	
9	CL-210473	Collar	
10	CL-410493	Arm, Annotation	
★ 11	CL-610594	Head & Arm Assy.	
12	1-118195-302	Washer, Plain, No. 1	
13	31-119918-2605	Screw, Pan Hd., 2-56 x 5/16 In.	
14	897912	Cable Assy., Paper Sensor	
15	CL-210245	Spacer, Rubber	
16	298042	Sensor	
17	797724-2	Cover, Modified (RS 3400)	KLM
17	797724-3	Cover, Modified (RS 3200)	NP
18	13-262715-8212	Screw, Self-Tapping, Flat Hd., 8-32 x 3/4 In.	
19	CL-811566	Plate Assy., Right Side (See Fig. 4-9)	
20	CL-310560	Wing, Right (RS 3200)	NP
21	13-120735-1208	Screw, Self-Tapping, Pan Hd., 12-32 x 1/2 In.	NP
22	265741-1	Bearing, Ball	
23	121271	Washer, Bronze, Phosphor, 0.257 In. ID x 0.38 In. OD	
24	2-240731-10	Ring, Retaining, External	
25	694520-1	Pulley Assy., 32 Teeth	
26	297805-1	Belt, Dual	
27	694520	Pulley Assy., 30 Teeth	
28	297910	Collar, Spacer	
29	CL-211466	Spacer, Wire	
30	CL-810240	Board Assy., Paper Out Sensor (See Fig. 4-35)	
31	31-119918-4004	Screw, Pan Hd., 4-40 x 1/4 In.	
	*697788	Motor Assy., Stepper	
32	CL-210980	Motor, Stepper	
33	31-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
34	697648	Mount Assy, Motor	
35	CL-211019	Pulley (Includes Set Screw)	
36	397869-2	Roll, Drive (RS 3400)	KLM
36	397869-3	Roll, Drive (RS 3200)	NP
37	CL-210659	Transformer	
38	13-262716-8204	Screw, Self-Tapping, Pan Hd., 8-32 x 1/4 In.	
39	397721	Cam, Pressure Roll	

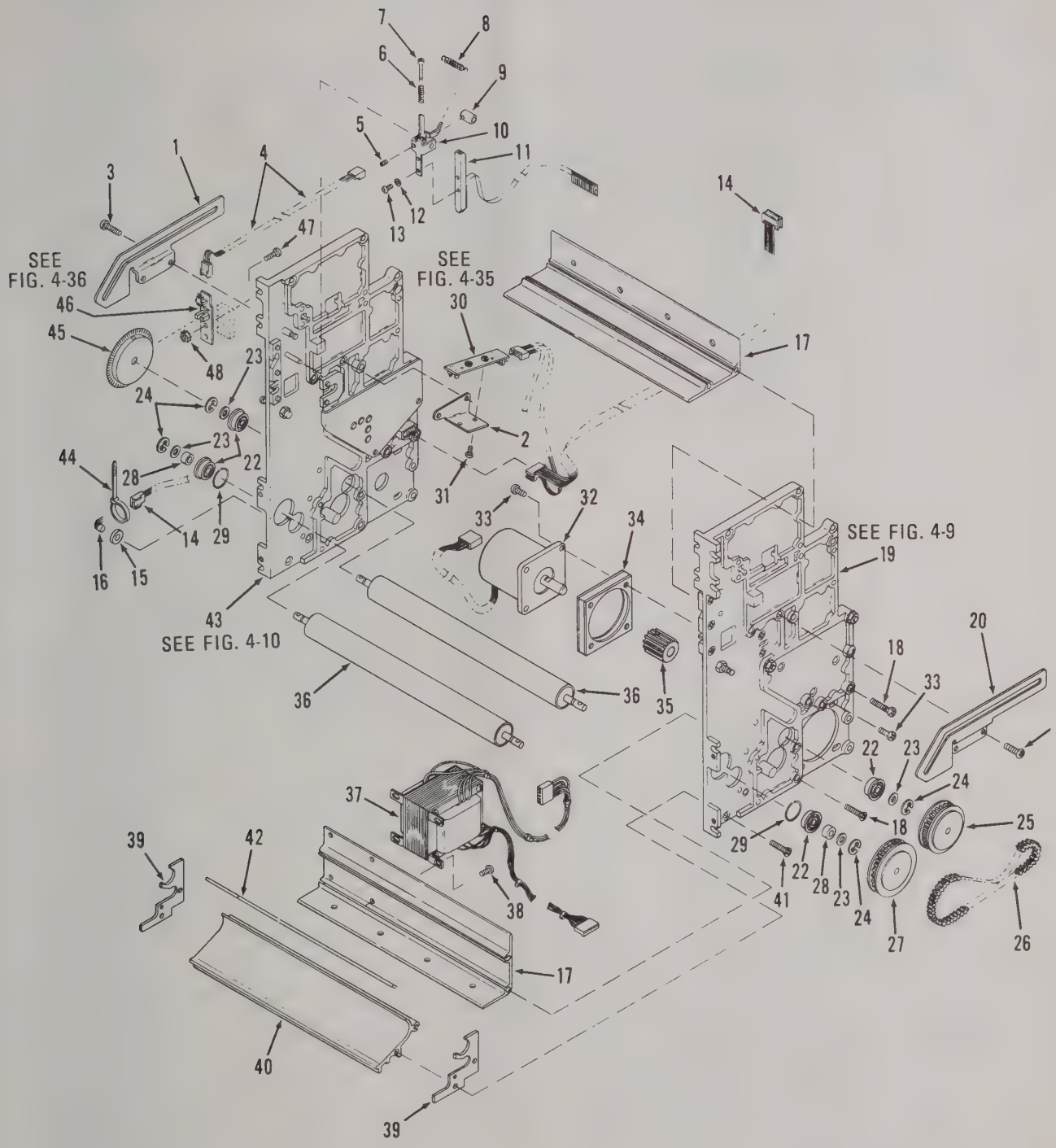


FIGURE 4-8 TRANSPORT ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
TRANSPORT ASSEMBLY
FIGURE 4-8

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
40	797695-2	Chute, Modified (RS 3400)	KLM
40	797695-3	Chute, Modified (RS 3200)	NP
41	13-262715-8212	Screw, Self-Tapping, Flat Hd., 8-32 x 3/4 In.	
42	267426-5	Deflector, Paper (RS 3400)	KLM
42	267426-6	Deflector, Paper (RS 3200)	NP
43	CL-811567	Plate Assy., Left Side (See Fig. 4-10)	
44	232997-23	Strap, Retaining Cable	
45	CL-710336	Wheel Assy., Timing	
46	CL-810290	Board Assy., Speed Monitor (See Fig. 4-36)	
47	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
48	243898-82	Nut, Assembled Lockwasher, No. 8-32	

RS 3400 & RS 3200 THERMAL RECORDER
SIDE PLATE ASSEMBLY, RIGHT
FIGURE 4-9

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-811566	Side Plate Assy., Right	
1	797625	Guide Assy., Right	
2	243898-82	Nut, Assembled Lockwasher, No. 8-32	
3	CL-411227	Side Plate, Front Right	
4	397640	Catch, Cover	
5	297639	Slide	
6	13-262715-8206	Screw, Self-Tapping, Flat Hd., 8-32 x 3/8 In.	
7	297803	Stud	
8	297638	Nut, Stud, 0.250-32 UNEF-2B	

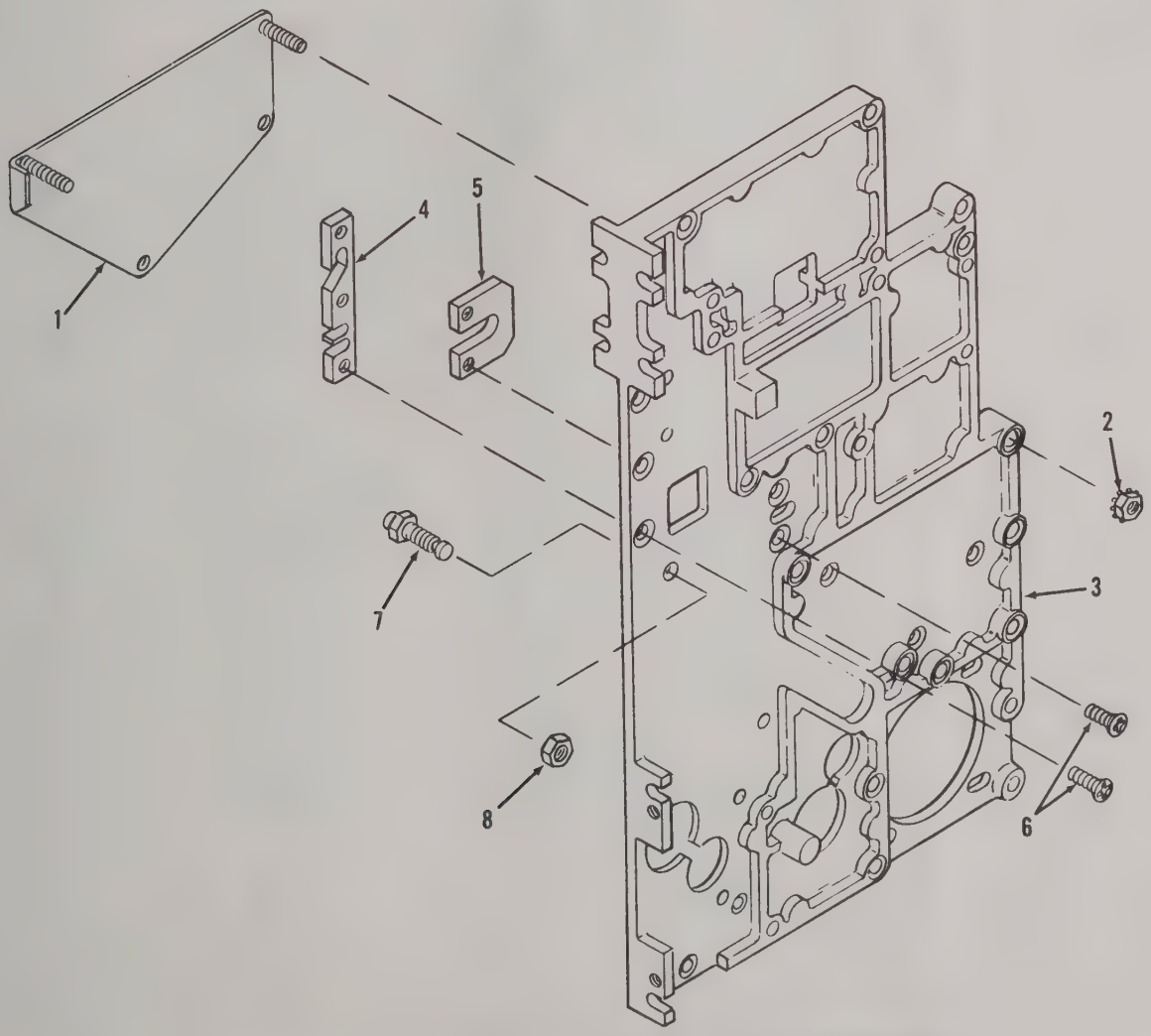


FIGURE 4-9 RIGHT HAND SIDE PLATE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
SIDE PLATE ASSEMBLY, LEFT
FIGURE 4-10

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-811567	Side Plate Assy., Left	
1	265874-3	Pin, Spring	
2	CL-211563	Pin, Annotation Support	
3	797626	Guide Assy., Left	
4	243898-82	Nut, Assembled Lockwasher, No. 8-32	
5	897635	Board Assy., Chart Supply Sensor (See Fig. 4-21)	
6	297639	Slide	
7	397640	Catch, Cover	
8	13-262715-8206	Screw, Self-Tapping, Flat Hd., 8-32 x 3/8 In.	
9	CL-411228	Side Plate, Front Left	
10	297803	Stud	
11	297638	Nut, Stud, 0.250-32 UNEF-2B	

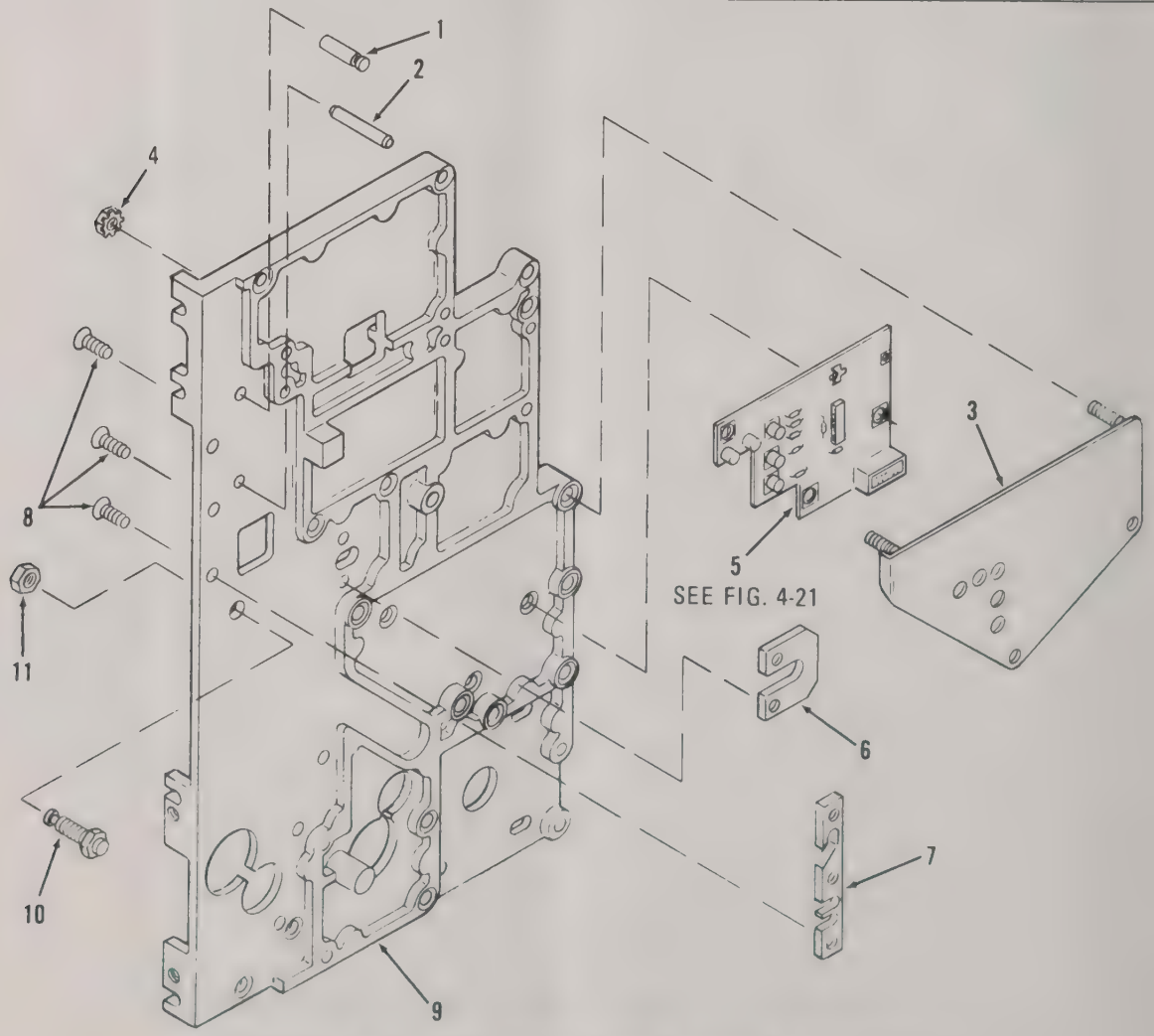


FIGURE 4-10 LEFT HAND SIDE PLATE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
PEN BAR ASSEMBLY
FIGURE 4-11

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-810819	Pen Bar Assy., Thermal, 4-50 mm (RS 3400)	K
	CL-810819-2	Pen Bar Assy., Thermal, 2-100 mm (RS 3400)	L
	CL-810819-1	Pen Bar Assy., Thermal, 2-50 mm, 1-100 mm (RS 3400)	M
	CL-810822	Pen Bar Assy., Thermal, 2-50 mm (RS 3200)	N
	CL-810822-1	Pen Bar Assy., Thermal, 1-100 mm (RS 3200)	P
1	897809-1	Board Assy., Pen Heat (See Fig. 4-29)	
2	13-262716-6212	Screw, Self-Tapping, Pan Hd., 6-32 x 3/4 In.	
3	249438-13	Washer, Spacer, Nylon	
4	897812-1	Board Assy., Mother-In-Law (RS 3400) (See Fig. 4-31)	KLM
4	897811-1	Board Assy., Mother-In-Law (RS 3200) (See Fig. 4-30)	NP
5	CL-310958-2	Shield, Board (RS 3400)	KLM
5	CL-310958-3	Shield, Board (RS 3200)	NP
6	13-262716-8212	Screw, Self-Tapping, Pan Hd., 8-32 x 3/4 In.	
7	297915-2	Washer, Spacer, Nylon, 0.375 In. Thk, 0.190 In. ID x 1/2 In. OD	
8	CL-811348	Board Assy., Lead Retainer (See Fig. 4-44)	L
9	13-262716-6212	Screw, Self-Tapping, Pan Hd., 6-32 x 3/4 In.	
10	249438-13	Washer, Spacer, Nylon	
11	CL-810172	Bar, Penmotor Mounting (RS 3400)	KLM
11	CL-710173	Bar, Penmotor Mounting (RS 3200)	NP
12	14-119923-0416	Screw, Set, Hex. Socket, Cup Point, 10-24 x 1 In.	KN
12	14-119923-0424	Screw, Set, Hex. Socket, Cup Point, 10-24 x 1-1/2 In.	LMP
13	CL-710145	Event Marker Assy., 50/100 mm	
14	267272-2	Washer, Flat	
15	31-119917-0003	Screw, Machine, Fillister Hd., 0-80 x 3/16 In.	
16	1-118195-303	Washer, Plain, No. 2	
17	1-216741-401	Lockwasher, Spring, Plain, No. 2	
18	31-119918-2605	Screw, Pan Hd., 2-56 x 5/16 In.	
19	CL-210577	Shield, Penmotor	
20	31-119918-8203	Screw, Pan Hd., 8-32 x 3/16 In.	
21	CL-310935	Bracket, Tip Support, Left	KMN
22	1-216741-401	Lockwasher, Spring, Plain, No. 2	KMN
23	31-119918-2605	Screw, Pan Hd., 2-56 x 5/16 In.	KMN
24	896683	Penmotor Assy., 50 mm	KMN
25	1-118195-307	Washer, Plain, No. 8	
26	1-216741-425	Lockwasher, Spring, Copper, No. 8	
27	31-119922-8206	Screw, Cap, Hex Socket Hd., 8-32 x 3/8 In.	

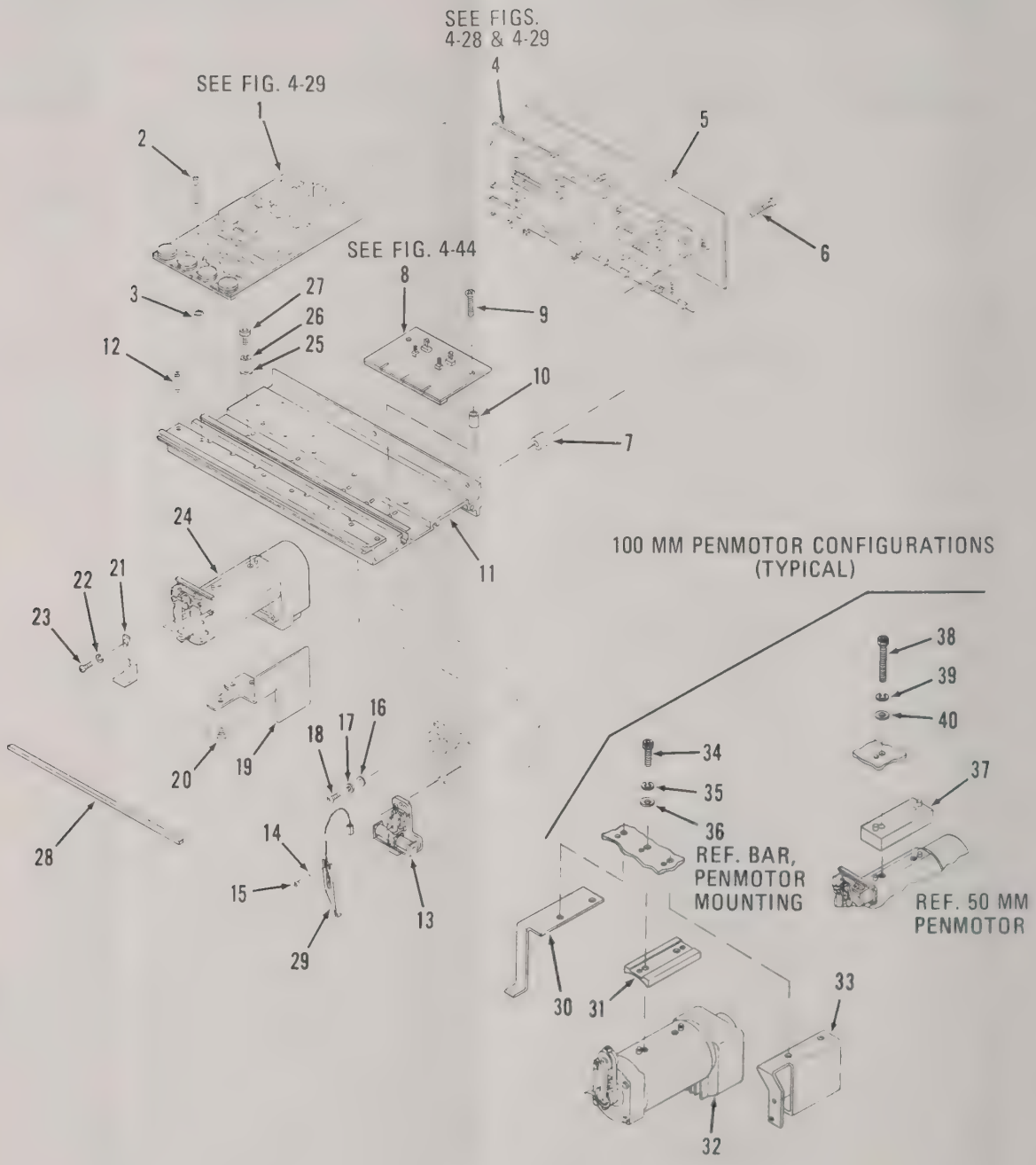


FIGURE 4-11 THERMAL PEN BAR ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
PEN BAR ASSEMBLY
FIGURE 4-11

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
28	267426-8	Deflector, Paper (RS 3400)	KLM
28	267426-9	Deflector, Paper (RS 3200)	NP
29	CL-710551	Pen Assy., Event, Thermal (Replacement Kit 11-2874-2A)	
30	CL-610915	Bracket Assy., Tip Support	LMP
31	CL-610211	Saddle, Penmotor	LMP
32	CL-810229	Penmotor Assy., 80/100 mm	LMP
33	CL-310470	Bracket	LP
34	31-119922-8206	Screw, Cap, Hex Socket Hd., 8-32 x 3/8 In.	LMP
35	1-216741-425	Lockwasher, Spring, Copper No. 8	LMP
36	1-118195-307	Washer, Plain, No. 8	LMP
37	CL-611435	Block Assy.	M
38	31-119922-8214	Screw, Cap, Hex Socket Hd., 8-32 x 7/8 In.	M
39	1-216741-425	Lockwasher, Spring, Copper No. 8	M
40	1-118195-307	Washer, Plain, No. 8	M

RS 3400 & RS 3200 THERMAL RECORDER
WRITING TABLE ASSEMBLY
FIGURE 4-12

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-810536-2	Table Assy., Writing, Thermal (RS 3400)	KLM
	CL-810536-3	Table Assy., Writing, Thermal (RS 3200)	NP
1	697860	Link Assy., Left	
2	127271	Washer, Bronze, Phosphor, 0.257 In. ID x 0.38 In. OD	
3	1-210761-6	Bearing, Ball	
4	297806-5	Roll, Rubber (RS 3400)	KLM
4	297806-6	Roll, Rubber (RS 3200)	NP
5	CL-210102-2	Tie Bar (RS 3400)	KLM
5	CL-210102-3	Tie Bar (RS 3200)	NP
6	697859	Link Assy., Right	
7	13-262715-6206	Screw, Self-Tapping, Flat Hd., 6-32 x 3/8 In.	
8	CL-710532	Support Assy., Right	
8	897866	Support Assy., Right	
9	297858	Support, Bearing	
10	297638	Nut, Stud, 0.250-32 UNEF-2B	
11	CL-210183-0206	Screw, Cap, Low Hd. Socket, 10-32 x 3/8 In.	
12	13-262715-6206	Screw, Self-Tapping, Flat Hd., 6-32 X 3/8 In.	
13	243867-1	"O" Ring	
14	1-297841-10	Ball Plunger	
15	797851-2	Bar, Pull (RS 3400)	KLM
15	797851-3	Bar, Pull (RS 3200)	NP
16	397790	Roll, Pressure (RS 3400)	KLM
16	CL-311339	Roll, Pressure (RS 3200)	NP
17	CL-710402-2	Bar, Writing (RS 3400)	KLM
17	CL-710402-3	Bar, Writing (RS 3200)	NP
18	CL-810407	Support, Left	
19	297858	Support, Bearing	
20	297638	Nut, Stud, 0.250-32 UNEF-2B	
21	13-262715-6206	Screw, Self-Tapping, Flat Hd., 6-32 x 3/8 In.	
22	CL-211232-2	Roll, Rubber (RS 3400)	KLM
22	CL-211232-3	Roll, Rubber (RS 3200)	NP

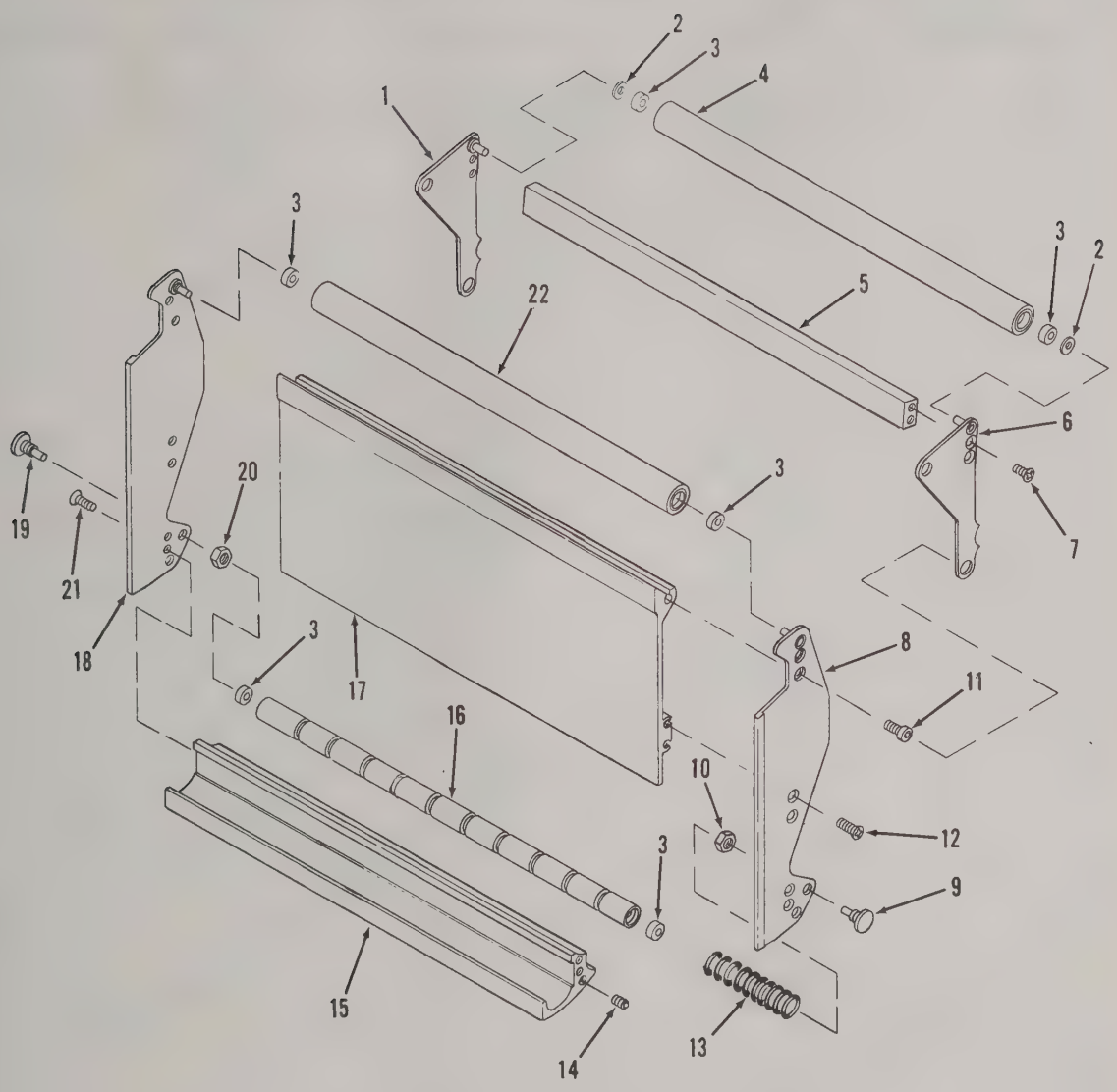


FIGURE 4-12 WRITING TABLE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
FAN FOLD PAPER TRAY ASSEMBLY
FIGURE 4-13

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	Not Procurable	Fan Fold Paper Tray Assy. (RS 3400)	KLM
	Not Procurable	Fan Fold Paper Tray Assy. (RS 3200)	NP
1	CL-210142-2	Bail (RS 3400)	KLM
1	CL-210142-3	Bail (RS 3200)	NP
2	243855-1	Ball Plunger	
3	CL-310221-2	Deflector, Fan Fold (RS 3400)	KLM
3	CL-310221-3	Deflector, Fan Fold (RS 3200)	NP
4	31-119918-8203	Screw, Pan Hd., 8-32 x 3/16 In.	
5	797946-2	Tray, Stationary (RS 3400)	KLM
5	797946-3	Tray, Stationary (RS 3200)	NP
6	797945-2	Tray, Pivoting (RS 3400)	KLM
6	797945-3	Tray, Pivoting (RS 3200)	NP
7	CL-310094	Ear, Right	
8	31-119918-8203	Screw, Pan Hd., 8-32 x 3/16 In.	
9	CL-310095	Ear, Left	
10	297587-2	Pin, Hinge (RS 3400)	KLM
10	297587-3	Pin, Hinge (RS 3200)	NP

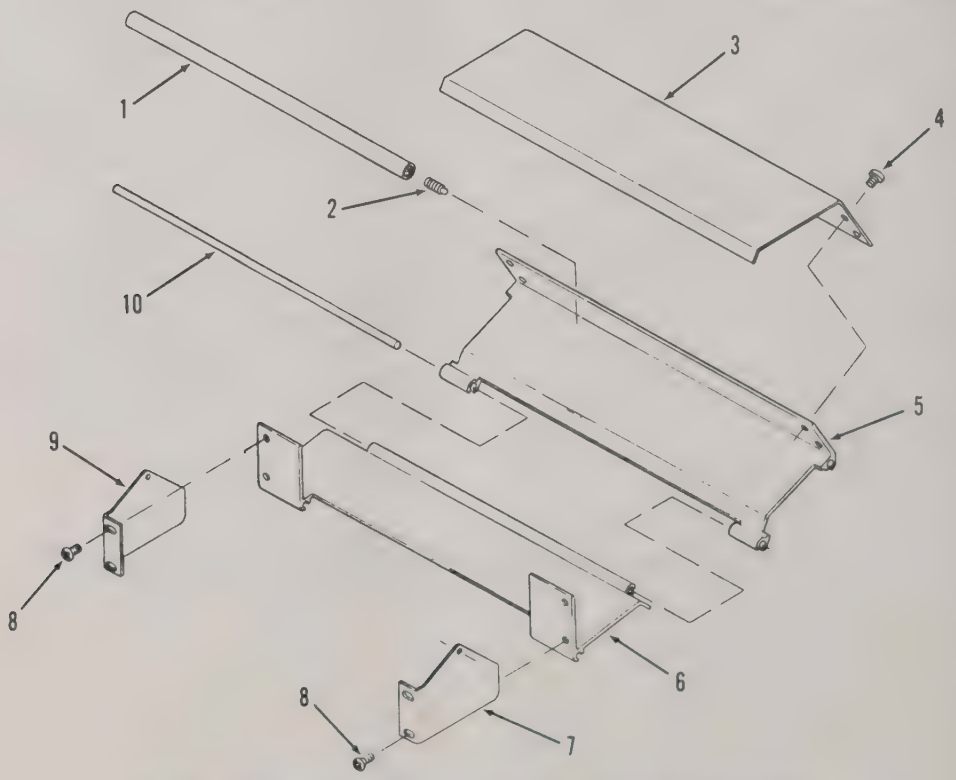


FIGURE 4-13 FAN FOLD PAPER TRAY ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
PANEL AND BEZEL ASSEMBLY
FIGURE 4-14

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-710826	Front Panel & Bezel Assy. (RS 3400)	KLM
	CL-710827	Front Panel & Bezel Assy. (RS 3200)	NP
1	CL-410530	Bezel (RS 3400)	KLM
1	CL-410529	Bezel (RS 3200)	NP
2	13-262716-8204	Screw, Self-Tapping, Pan Hd., 8-32 x 1/4 In.	
3	CL-710812	Front Panel Assy. (RS 3400)	KLM
3	CL-710828	Front Panel Assy. (RS 3200)	NP
4	310416	Cap, Panel	

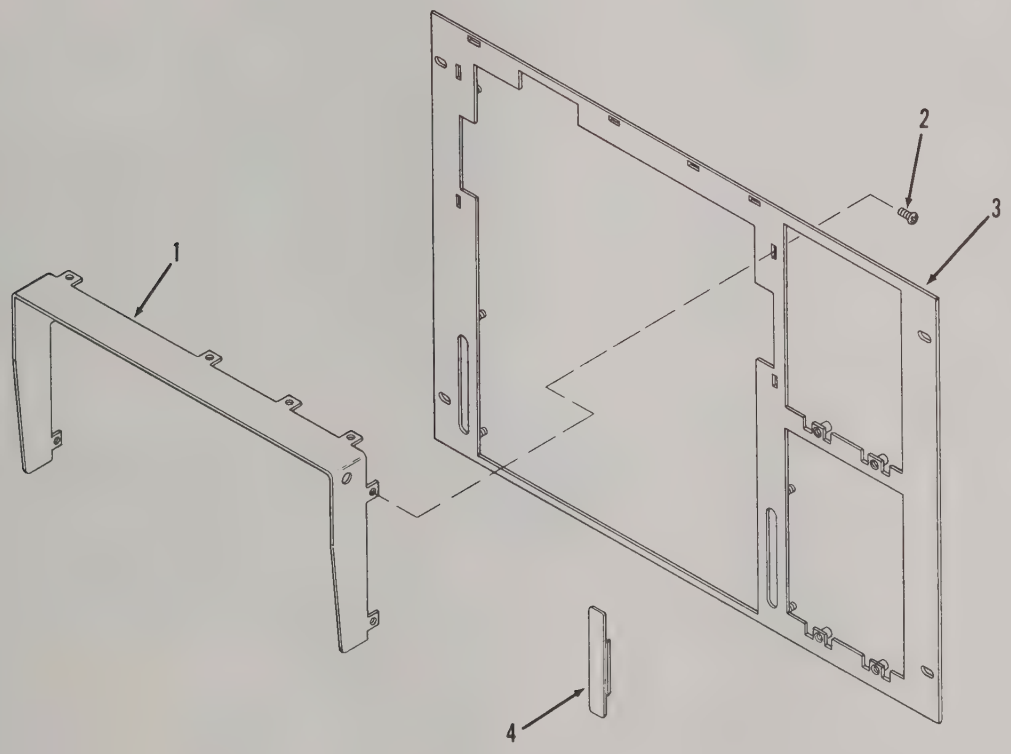


FIGURE 4-14 PANEL AND BEZEL ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
CONTROL PANEL ASSEMBLY
FIGURE 4-15

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-810780	Control Panel Assy., 4-50 mm (RS 3400)	K
	CL-810924	Control Panel Assy., 2-100 mm (RS 3400)	L
	CL-810923	Control Panel Assy., 2-50 mm, 1-100 mm (RS 3400)	M
	CL-810781	Control Panel Assy., 2-50 mm (RS 3200)	N
	CL-810925	Control Panel Assy., 1-100 mm (RS 3200)	P
1	CL-410385	Side, Keybox, Left (RS 3400)	KLM
2	CL-410383	Side, Keybox, Left (RS 3200)	NP
3	CL-810418	Keybox, Back (RS 3400)	KLM
3	CL-810417	Keybox, Back (RS 3200)	NP
4	31-119920-6208	Screw, Machine, Flat Hd., 6-32 x 1/2 In.	
5	CL-210811-1	Fastener, Scotchmate	
6	CL-410386	Side, Keybox, Right (RS 3400)	KLM
6	CL-410384	Side, Keybox, Right (RS 3200)	NP
7	13-262715-6206	Screw, Self-Tapping, Flat Hd., 6-32 x 3/8 In.	
8	897844-1	Board Assy., PC, Panel, 4-50 mm (RS 3400) (See Fig. 4-33)	K
8	897844-2	Board Assy., PC, Panel, 2-100 mm (RS 3400) (See Fig. 4-33)	L
8	897844-3	Board Assy., PC, Panel, 2-50 mm, 1-100 mm (RS 3400) (See Fig. 4-33)	M
8	897843-1	Board Assy., PC, Panel, 2-50 mm (RS 3200) (See Fig. 4-32)	N
8	897843-2	Board Assy., PC, Panel, 1-100 mm (RS 3200) (See Fig. 4-32)	P
9	297915-3	Washer, Spacer, Nylon, 0.250 In. Thk, 0.170 In. ID x 0.350 In. OD	
10	297908-1	Button, Switch	
11	CL-410348	Door, Keyboard	
12	CL-810787	Control Panel Assy., Overlay, 4-50 mm (RS 3400)	K
12	CL-810929	Control Panel Assy., Overlay, 2-100 mm (RS 3400)	L
12	CL-810928	Control Panel Assy., Overlay, 2-50 mm, 1-100 mm (RS 3400)	M
12	CL-810786	Control Panel Assy., Overlay, 2-50 mm (RS 3200)	N
12	CL-810930	Control Panel Assy., Overlay, 1-100 mm (RS 3200)	P
12	CL-410783	Overlay, Top (RS 3400)	KLM
12	CL-410785	Overlay, Top (RS 3200)	NP
12	CL-410728	Overlay, Middle (Keyboard)	KLM
12	CL-410729	Overlay, Middle (Keyboard)	NP
12	CL-410782	Overlay, Bottom (Pen Position)	K
12	CL-810931	Overlay, Bottom (Pen Position)	L
12	CL-410926	Overlay, Bottom (Pen Position)	M
12	CL-410784	Overlay, Bottom (Pen Position)	N
12	CL-410932	Overlay, Bottom (Pen Position)	P
13	CL-710619-1	Button, Stamped, STOP	
14	CL-710619-2	Button, Stamped, 5	
15	CL-710619-3	Button, Stamped, 10	
16	CL-710619-4	Button, Stamped, 25	
17	CL-710619-5	Button, Stamped, 50	
18	CL-710619-6	Button, Stamped, 100	

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
19	CL-710619-7	Button, Stamped, 250	
20	CL-710619-8	Button, Stamped, 500	
21	CL-710619-9	Button, Stamped, VAR SPEED	
22	CL-710619-10	Button, Stamped, DIVIDE BY	
23	CL-710619-11	Button, Stamped, EXT	
24	CL-710619-12	Button, Stamped, CHART SPLY	
25	CL-710619-13	Button, Stamped, LOCAL RMT	
26	CL-710619-14	Button, Stamped, PRINT	
27	CL-710619-15	Button, Stamped, LEFT EVENT	
28	CL-710619-16	Button, Stamped, RIGHT EVENT	

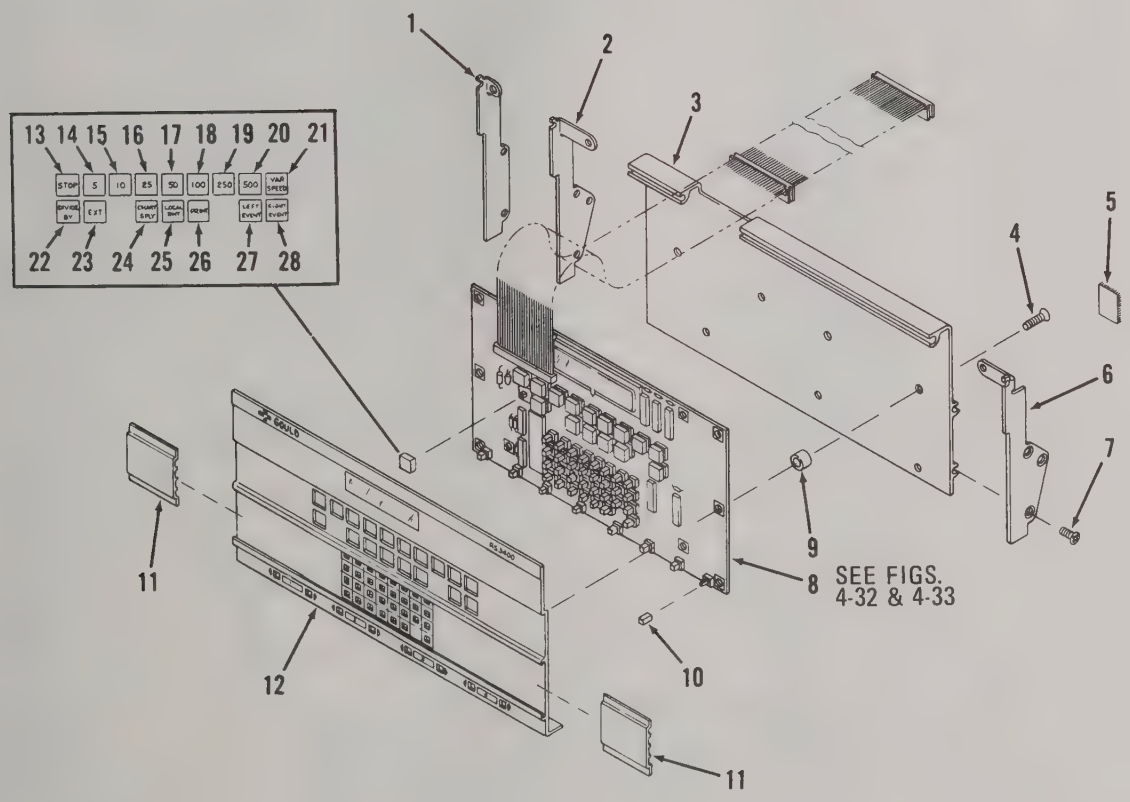


FIGURE 4-15 CONTROL PANEL ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
ENCLOSURE ASSEMBLY
FIGURE 4-16

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-811646	Enclosure Assy. (RS 3400)	KLM
	CL-811643	Enclosure Assy. (RS 3200)	NP
1	CL-310769	Guide	
2	CL-610771-1	Guide, Engraved '1'	
3	CL-610771-3	Guide, Engraved	KLM
4	13-262716-2604	Screw, Self-Tapping, Pan Hd., 2-56 x 1/4 In.	
5	CL-210796	Support	
6	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
7	CL-811640	Board Assy., Mother (RS 3400) (See Fig. 4-43)	KLM
7	CL-811619	Board Assy., Mother (RS 3200) (See Fig. 4-42)	NP
8	31-119998-6204	Screw, Pan Hd., 6-32 x 1/4 In.	
	CL-710760	Panel Subassy., Rear (RS 3400)	KLM
	CL-710799	Panel Subassy., Rear (RS 3200)	NP
9	CL-410737	Panel, Rear (RS 3400)	KLM
9	CL-410798	Panel, Rear (RS 3200)	NP
10	269247-1	Spacer, Sleeve, Threaded	
11	13-262716-6204	Screw, Self-Tapping, Pan Hd., 6-32 x 1/4 In.	
12	CL-610814	Cable Assy., BNC	
13	270903-6	Clamp, Cable	
14	CL-310806	Cover, Rear (RS 3400)	KLM
14	CL-310809	Cover, Rear (RS 3200)	NP
15	13-262716-6204	Screw, Self-Tapping, Pan Hd., 6-32 x 1/4 In.	
16	CL-210805	Bracket (RS 3400)	KLM
16	CL-210797	Bracket (RS 3200)	NP
17	13-262716-6204	Screw, Self-Tapping, Pan Hd., 6-32 x 1/4 In.	
18	243898-62	Nut, Assembled Lockwasher, No. 6-32	
19	CL-810439	Board Assy., Medical Output (RS 3400) (See Fig. 4-38)	KLM
19	CL-810462	Board Assy., Medical Output (RS 3200) (See Fig. 4-40)	NP
20	31-119998-6204	Screw, Pan Hd., 6-32 x 1/4 In.	
21	CL-810438	Board Assy., Interconnect (RS 3400) (See Fig. 4-37)	KLM
21	CL-810461	Board Assy., Interconnect (RS 3200) (See Fig. 4-39)	NP
22	31-119998-6204	Screw, Pan Hd., 6-32 x 1/4 In.	
	CL-710772	Enclosure Subassy. (RS 3400)	KLM
	CL-710801	Enclosure Subassy. (RS 3200)	NP
23	269247-1	Spacer, Sleeve, Threaded	
24	269247-7	Spacer, Sleeve, Threaded	
25	CL-410735	Enclosure (RS 3400)	KLM
25	CL-410800	Enclosure (RS 3200)	NP
	CL-710761	Shelf Subassy., Lower (RS 3400)	KLM
	CL-710794	Shelf Subassy., Lower (RS 3200)	NP
26	CL-410738	Shelf, Lower (RS 3400)	KLM

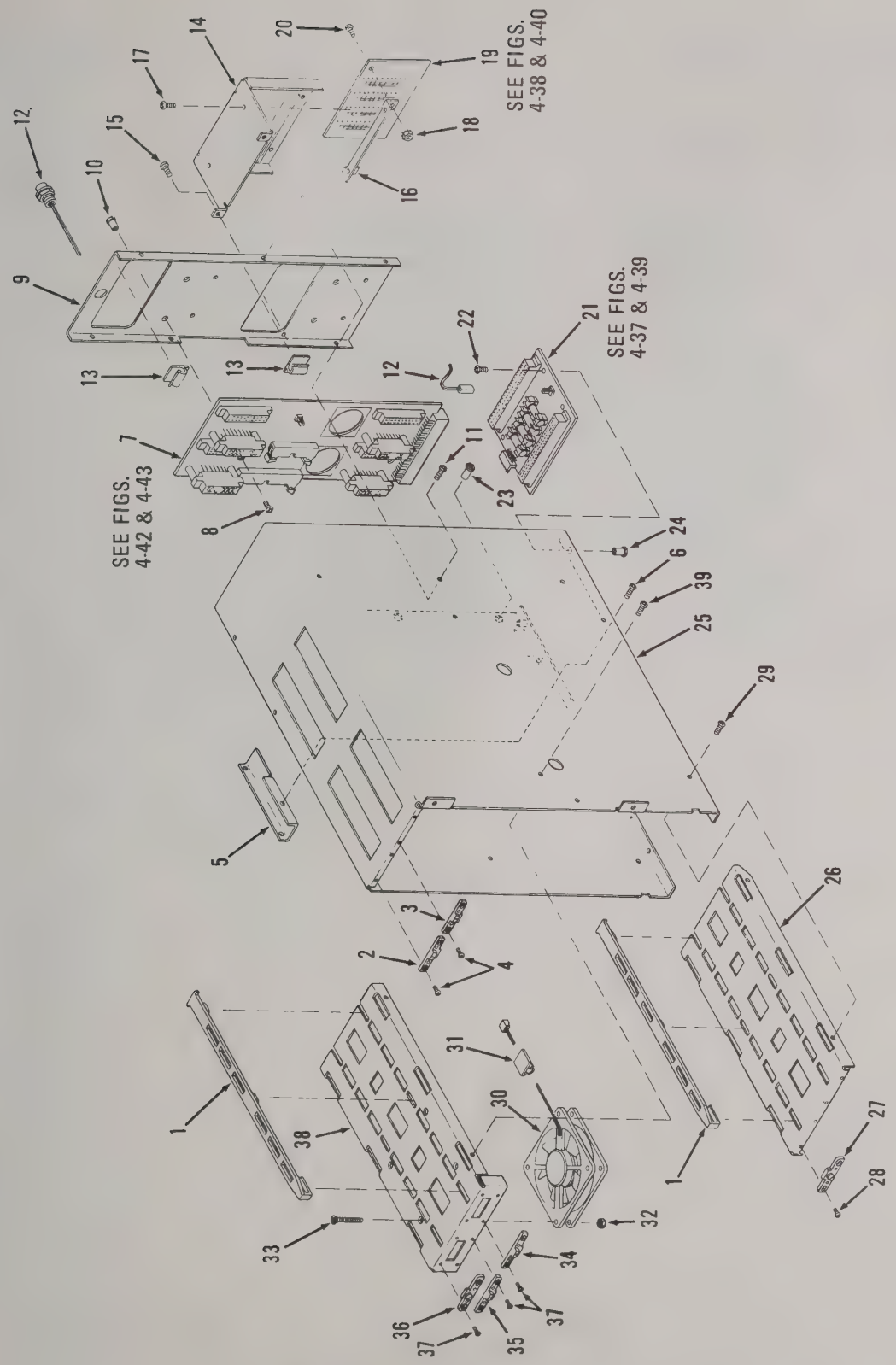


FIGURE 4-16 ENCLOSURE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
ENCLOSURE ASSEMBLY
FIGURE 4-16

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
26	CL-410795	Shelf, Lower (RS 3200)	NP
27	386058-6	Guide, Preamp-Bottom	
28	13-262716-2604	Screw, Self-Tapping, Pan Hd., 2-56 x 1/4 In.	
29	13-262716-6204	Screw, Self-Tapping, Pan Hd., 6-32 x 1/4 In.	
	CL-711645	Shelf Subassy., Upper (RS 3400)	KLM
	CL-711642	Shelf Subassy., Upper (RS 3200)	NP
30	CL-711590	Fan Assy. (RS 3400)	KLM
30	CL-711591	Fan Assy. (RS 3200)	NP
31	270903-6	Clamp, Cable	
32	243898-40	Nut, Assembled Lockwasher, No. 4-40	
33	31-119920-4014	Screw, Machine, Flat Hd., 4-40 x 7/8 In.	
34	CL-610771-4	Guide, Engraved '4'	KLM
35	CL-610771-2	Guide, Engraved '2'	
36	386058-6	Guide, Preamp-Bottom	
37	13-262716-2604	Screw, Self-Tapping, Pan Hd., 2-56 x 1/4 In.	
38	CL-411644	Shelf, Upper (RS 3400)	KLM
38	CL-411641	Shelf, Upper (RS 3200)	NP
39	13-262716-6204	Screw, Self-Tapping, Pan Hd., 6-32 x 1/4 In.	

RS 3400 & RS 3200 THERMAL RECORDER
PC BOARD INSTALLATION
FIGURE 4-17

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	Not Procurable	PC Board Installation (RS 3400)	KLM
	Not Procurable	PC Board Installation (RS 3200)	NP
1	CL-210649	Window, Voltage	
2	13-262715-8206	Screw, Self-Tapping, Flat Hd., 8-32 x 3/8 In.	
3	CL-811462	Panel Assy., Silkscreen (RS 3400)	KLM
3	CL-811463	Panel Assy., Silkscreen (RS 3200)	NP
4	13-262716-8204	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
5	CL-810105	Card Cage Assy. (RS 3400) (See Fig. 4-18)	KLM
5	CL-810106	Card Cage Assy. (RS 3200) (See Fig. 4-18)	NP
6	497867	Power Supply, Dual Assy.	
7	897515	Board Assy., Power Supply, 5 V. (See Fig. 4-20)	
8	897658	Board Assy., Chart Drive (See Fig. 4-26)	
9	897637	Board Assy., Controller (See Fig. 4-23)	
10	CL-810312	Board Assy., Dummy Interface	
11	897406	Board Assy., Pen Servo Control (See Fig. 4-19)	

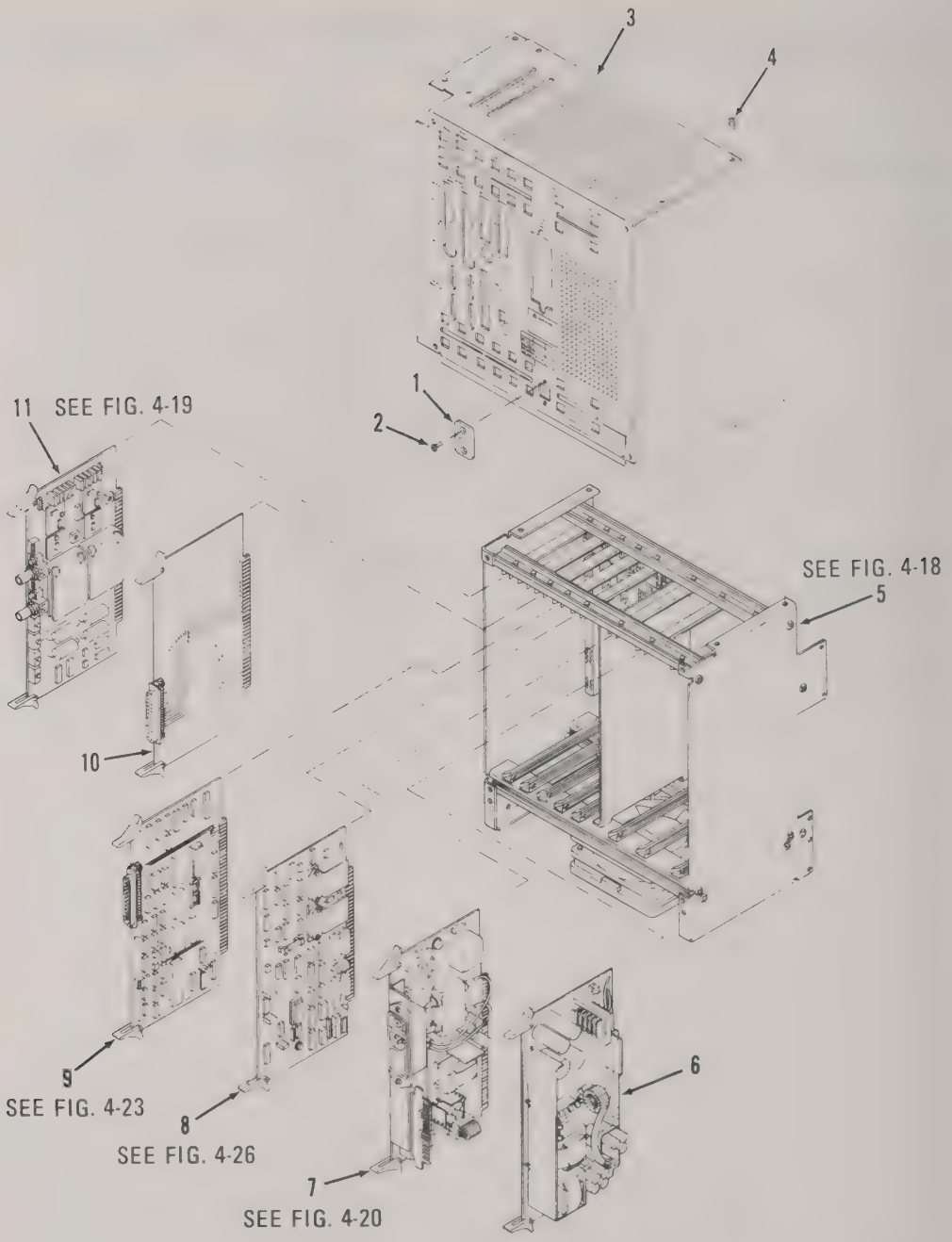


FIGURE 4-17 PC BOARD INSTALLATION

RS 3400 & RS 3200 THERMAL RECORDER
CARD CAGE ASSEMBLY
FIGURE 4-18

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	*CL-810105	Card Cage Assy. (RS 3400)	KLM
	*CL-810106	Card Cage Assy. (RS 3200)	NP
1	797904-2	Support, Mother Board (RS 3400)	KLM
1	797904-3	Support, Mother Board (RS 3200)	NP
2	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
3	CL-310958-5	Shield, Board (RS 3400)	KLM
3	CL-310958-6	Shield, Board (RS 3200)	NP
4	297915-1	Washer, Spacer, Nylon, 0.165 In. Thk., 0.165 In. ID x 1/2 In. OD	
5	897651	Board Assy., Mother (RS 3400) (See Fig. 4-25)	KLM
5	897650	Board Assy., Mother (RS 3200) (See Fig. 4-24)	NP
6	13-262716-8208	Screw, Self-Tapping, Pan Hd., 8-32 x 1/2 In.	
7	497847	Side Plate, Rear Left	
	*897918-2	Fan Assy. (RS 3400)	KLM
	*897918-3	Fan Assy. (RS 3200)	NP
8	797919-2	Support, Fan (RS 3400)	KLM
8	797919-3	Support, Fan (RS 3200)	NP
9	297719	Fan	
10	297715-1	Filter Assy.	
11	13-262716-0208	Screw, Self-Tapping, Pan Hd., 10-32 x 1/2 In.	
12	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
	*797905-2	Card Guide Assy. (RS 3400)	KLM
	*797905-3	Card Guide Assy. (RS 3200)	NP
13	897906-2	Support, Card Guide (RS 3400)	KLM
13	897906-3	Support, Card Guide (RS 3200)	NP
14	297800-2	Card Guide	
15	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
16	397929	Mid Plate, Rear	
17	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
18	497846	Side Plate, Rear Right	
19	1-128693-3	Grommet, Caterpillar	

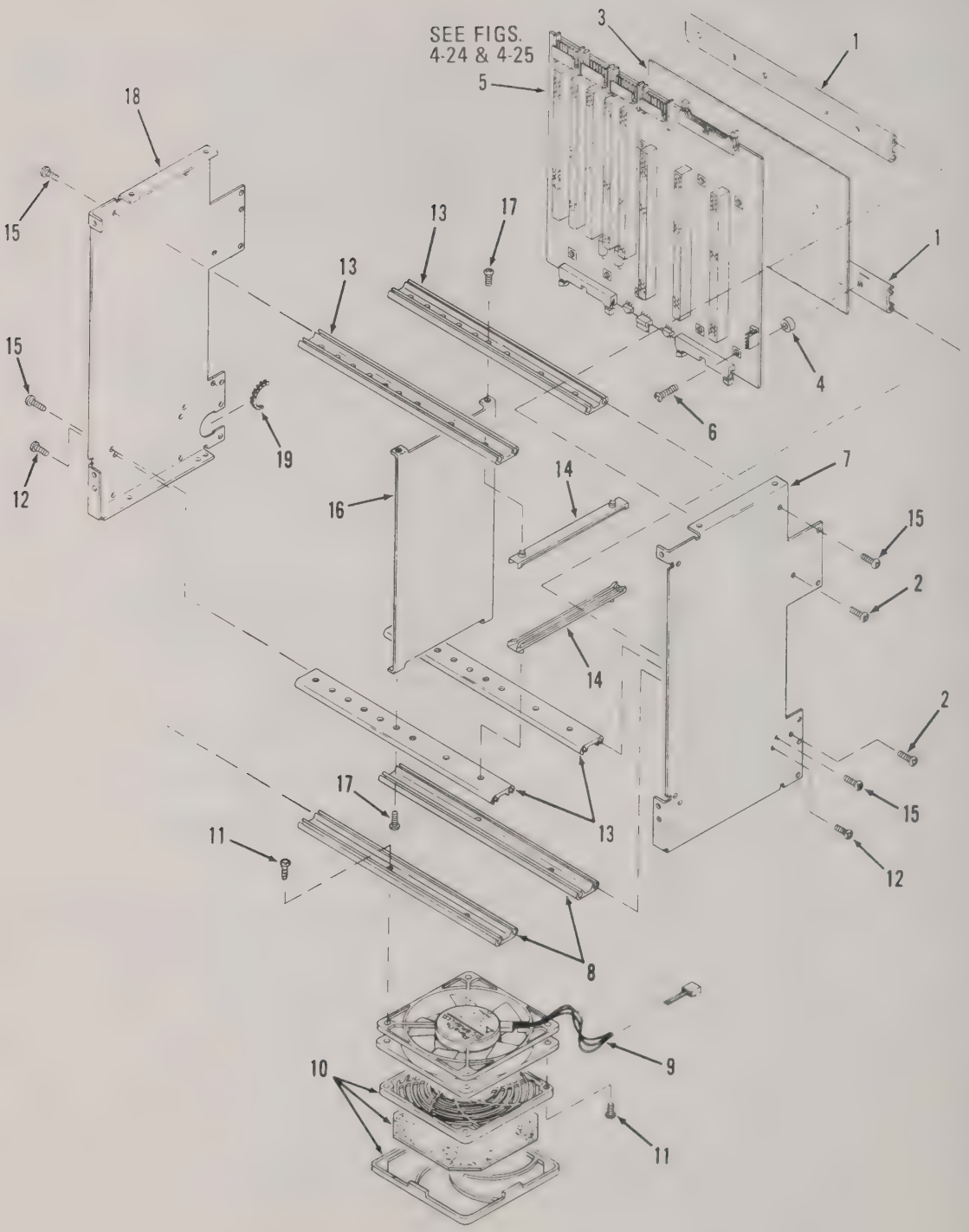


FIGURE 4-18 CARD CAGE ASSEMBLY

DESIGNATION	PART NUMBER	DESCRIPTION
C1	287614-223	Capacitor 0.022UF
C2,C3	263386-108	Capacitor 1000UF
C4-C7	262585-106	Capacitor 10.0UF
C8-C10	288755-103	Capacitor 0.01UF
C11	262585-106	Capacitor 10.0UF
C12	287614-222	Capacitor 0.0022UF
C13	287614-103	Capacitor 0.01UF
C14	287614-221	Capacitor 0.00022UF
CB1,CB2	297966-3	Circuit Breaker
CR1,CR2	270508	Diode 1N4454
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
J1	298040	BNC Connector
J2	297967	Phone Jack
K1	288753	Relay
L1	CL-210014-1	Inductor 2.2MH
Q1-Q9	Not Used	
Q10	281702-2	Transistor 2N4401
R1,R2	293941-103	Potentiometer 10K
R3	293941-503	Potentiometer 50K
R4,R5	293941-502	Potentiometer 5K
R6	284878-103	Potentiometer 10K
R7	CL-210097-1003	Resistor 100K
R8	CL-210097-2503	Resistor 250K
R9	CL-210097-5003	Resistor 500K
R10	CL-210097-1673	Resistor 167K
R11	CL-210097-1253	Resistor 125K
R12	CL-210099-2001	Resistor 2K
R13	CL-210099-5000	Resistor 500 Ohms
R14	CL-210099-1803	Resistor 180K
R15-R26	Not Used	
R27	CL-210099-2000	Resistor 200 Ohms
R28	CL-210099-1002	Resistor 10K
R29	CL-210099-2002	Resistor 20K
R30	CL-210099-5001	Resistor 5K
R31	CL-210099-2002	Resistor 20K
R32	CL-210099-1001	Resistor 1K
R33	CL-210099-5001	Resistor 5K
R34	CL-210099-1001	Resistor 1K
R35	CL-210099-1003	Resistor 100K

DESIGNATION	PART NUMBER	DESCRIPTION
R36	CL-210099-4703	Resistor 470K
R37	CL-210099-1001	Resistor 1K
R38	CL-210099-2002	Resistor 20K
R39	CL-210099-6202	Resistor 62K
R40	293941-103	Potentiometer 10K
R41	5-241111-226	Resistor 22 Meg
SW1	297965-6	DIP Switch
TP	2-287495-6	Connector
U1	297499	Control Amplifier Hybrid
U2	297498	Oscillator Demodulator Hybrid
U3	CL-810380	Pen Servo Output Module
U4	CL-210009	I.C. MP7542
U5	296119-2	I.C. LF412
U6	291593	I.C. MC7812 (A-P)
	31-119918-4005	Screw
	243898-40	Nut
		----- * -----
U7	291592	I.C. MC7912 (A-P)
	31-119918-4005	Screw
	243898-40	Nut
		----- * -----
U8	296674-139	I.C. 74HC139
U9	296674-74	I.C. 74HC74
U10	289388	I.C. 78L05
U11	297306	I.C. LT1012CN8

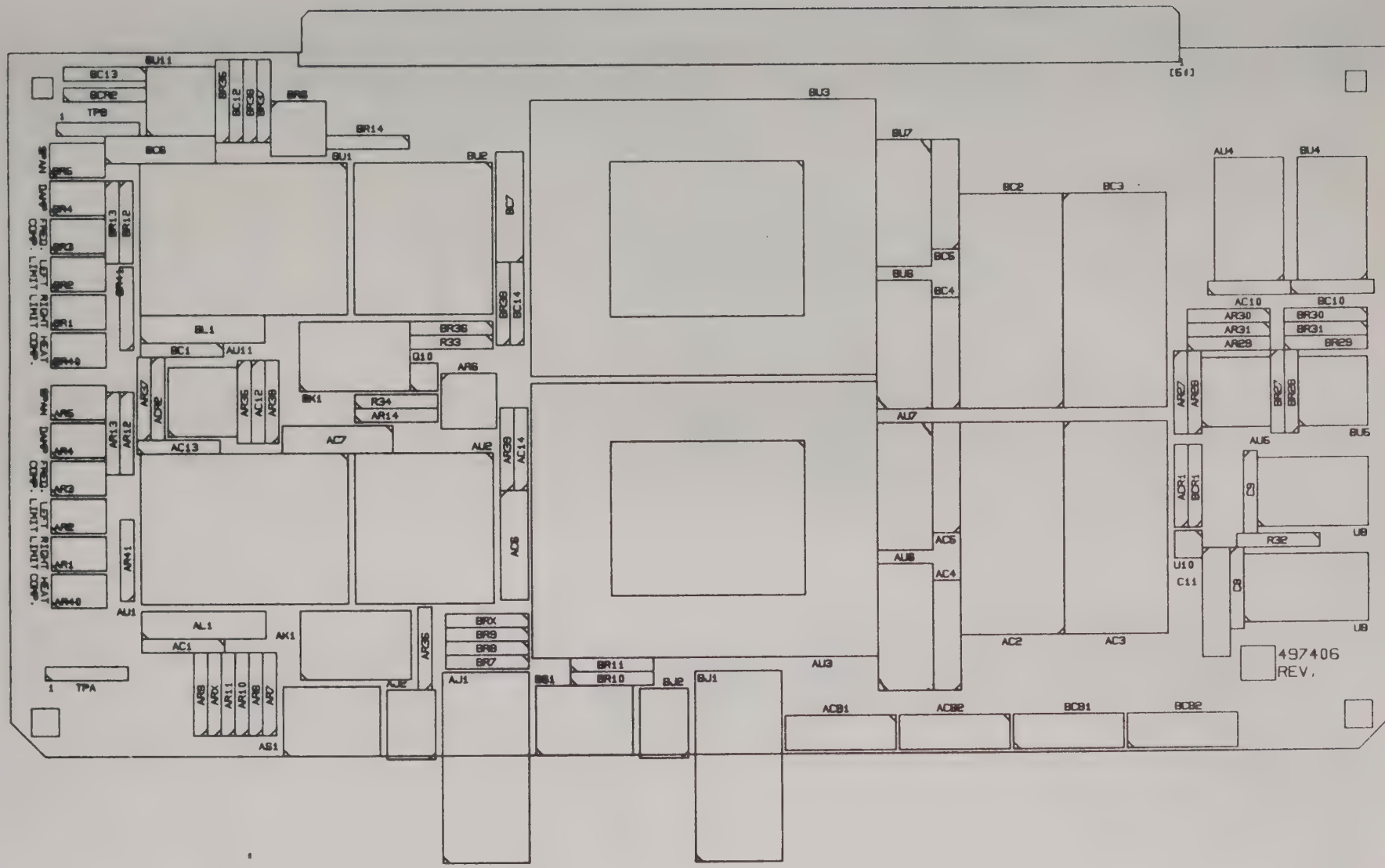


FIGURE 4-19 SERVO DRIVE BD.

DESIGNATION	PART NUMBER	DESCRIPTION
B1	CL-210118	Battery (A-P)
	232997-23	Tie Wrap
		----- * -----
BH1	CL-210206	Battery Holder
C1	Not Used	
C2	287614-223	Capacitor 0.022UF
C3-C9	Not Used	
C10-C12	283943-106	Capacitor 10UF
CR1-CR8	Not Used	
CR9	269256-7	Diode IN4057
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
J1	1-293738-60	Connector
J2	CL-610789	Line Filter Cable Assy.
J3	CL-610788	Cable Assy.
J4,J5	Not Used	
J6	CL-610790	Cable Assy.
J7	CL-610791	Line Input Cable Assy.
K1	294198-40	Relay
L1	CL-210014-1	Inductor
LF	CL-210204	RFI Filter (A-P)
	31-119918-6204	Screw
	1-216741-420	Lockwasher
	31-119998-62	Nut
		----- * -----
P1	CL-810466	P.C. Board Voltage/Select (Not Shown)
P2-P4	281711-6	Connector
P5	Not Used	
P6	281711-6	Connector
PR1	CL-210203	Power Receptacle (A-P)
	CL-310215	Bracket
	13-262716-6210	Screw
		----- * -----
PSM1	CL-210774	Power Supply Module (A-P)

DESIGNATION	PART NUMBER	DESCRIPTION
	31-119918-6210	Screw
	297915-4	Washer
	297915-3	Spacer
	1-216741-420	Lockwasher
	31-119998-62	Nut
		----- * -----
R1,R2	Not Used	
R3	CL-210099-4990	Resistor
R4-R10	Not Used	
R11	CL-210099-4991	Resistor
RN1,RN2	Not Used	
RN3	297492	Resistor Network
TP1	Not Used	
TP2	265763-3	Contact
U1	CL-210196	DC/DC Convertor
U2-U4	Not Used	
U5	296678	I.C. LH0070
U6	291062-3	I.C. TL084CN
U7	CL-610991	I.C. Programmed
U8	297307-3	I.C. LF13333N
UX1	285593-20	I.C. Socket

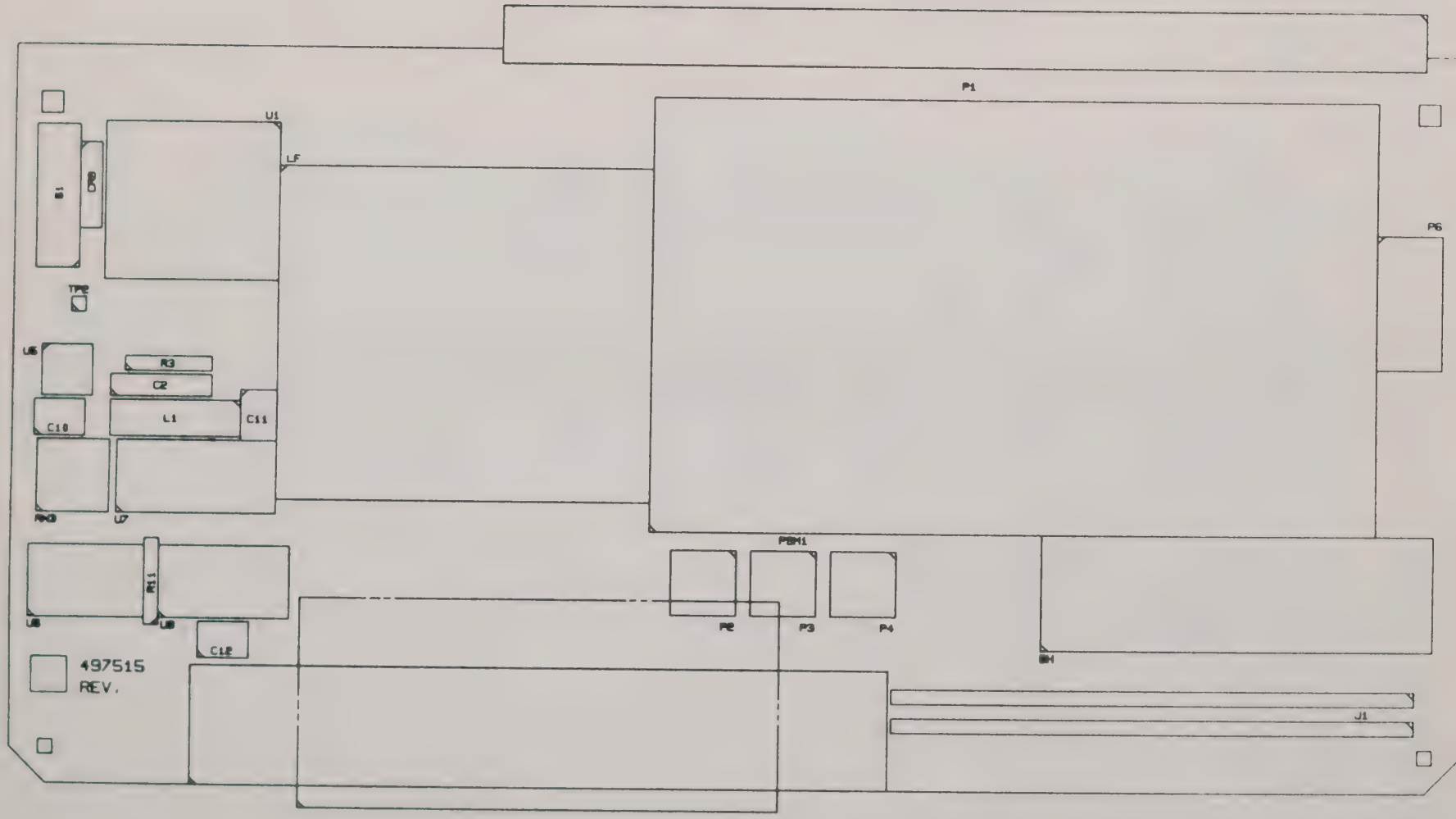


FIGURE 4-20 5 VOLT POWER SUPPLY BD.

RS 3200 & RS 3400
PC BOARD ASSY., CHART SUPPLY SENSOR 897635
FIGURE 4-21

DESIGNATION	PART NUMBER	DESCRIPTION
J1	CL-210228-10	Connector
R1	CL-210099-51R0	Resistor 51 Ohms
R2-R4	CL-210099-1002	Resistor 10K
R5	CL-210099-82R0	Resistor 82 Ohms
R6	CL-210099-1002	Resistor 10K
R7	CL-210099-82R0	Resistor 82 Ohms
U1-U3	298042	Photo Sensor (A-P)
	243104-5	Insulator Washer
		----- * -----
U4	296674-125	I.C. 74HC125
U5,U6	298042	Photo Sensor (A-P)
	243104-5	Insulator Washer
		----- * -----

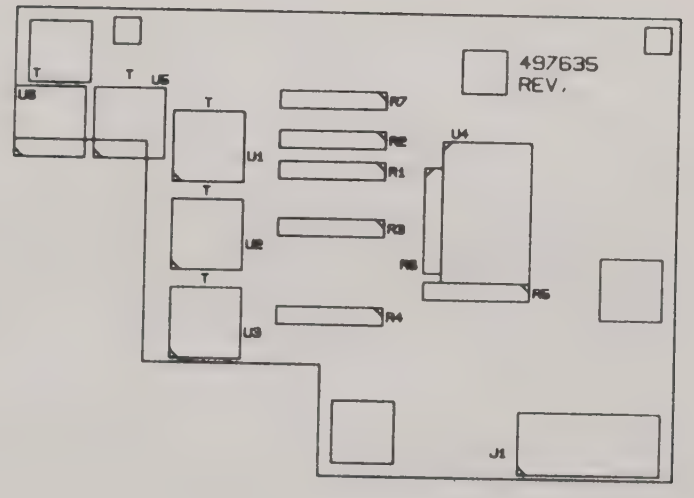


FIGURE 4-21 CHART SUPPLY SENSOR BD.

RS 3200 & RS 3400
PC BOARD ASSY., IRIG INTERFACE 897636
FIGURE 4-22

DESIGNATION	PART NUMBER	DESCRIPTION
C1	10-241145-105	Capacitor 1UF
C2	10-269100-205	Capacitor 2UF
C3	287614-102	Capacitor 1000PF
C4-C18	288755-104	Capacitor 0.1UF
C19-C-21	283943-106	Capacitor 10UF
C22,C23	283943-156	Capacitor 15UF
CR1-CR7	280440	Diode IN4148
J1	294310-2	Connector
J2	292709-16	Connector
P1	296520-1	Shorting Plug
R1-R3	CL-210099-1001	Resistor 1K
R4-47	CL-210099-2001	Resistor 2K
R8	CL-210099-4001	Resistor 4K
R9	CL-210099-5001	Resiistor 5K
R10-R12	CL-210099-1002	Resistor 10K
R13	1-265969-20003	Resistor 2 Meg
R14	5-241111-271	Resistor 270 Ohms
R15	CL-210099-5002	Resistor 50K
R16,R17	Not Used	
R18	5-241111-242	Resistor 2.4K

DESIGNATION	PART NUMBER	DESCRIPTION
R19	5-241111-362	Resistor 3.6K
RN1	2-283274-102	Resistor Network 1K
SW1	1-295641-1	DIP Switch DPST
U1	296674-00	I.C. 74HC00
U2	296674-04	I.C. 74HC04
U3	296674-14	I.C. 74HC14
U4	296674-08	I.C. 74HC08
U5,U6	296674-27	I.C. 74HC27
U7	296674-32	I.C. 74HC32
U8-U10	296674-74	I.C. 74HC74
U11	296674-125	I.C. 74HC125
U12	296674-174	I.C. 74HC174
U13-U15	296674-390	I.C. 74HC390
U16	296674-393	I.C. 74HC393
U17	296674-147	I.C. 74HC147
U18	296378	I.C. RDD104
U19	291062-3	I.C. TL084
U20	296120	I.C. LM319

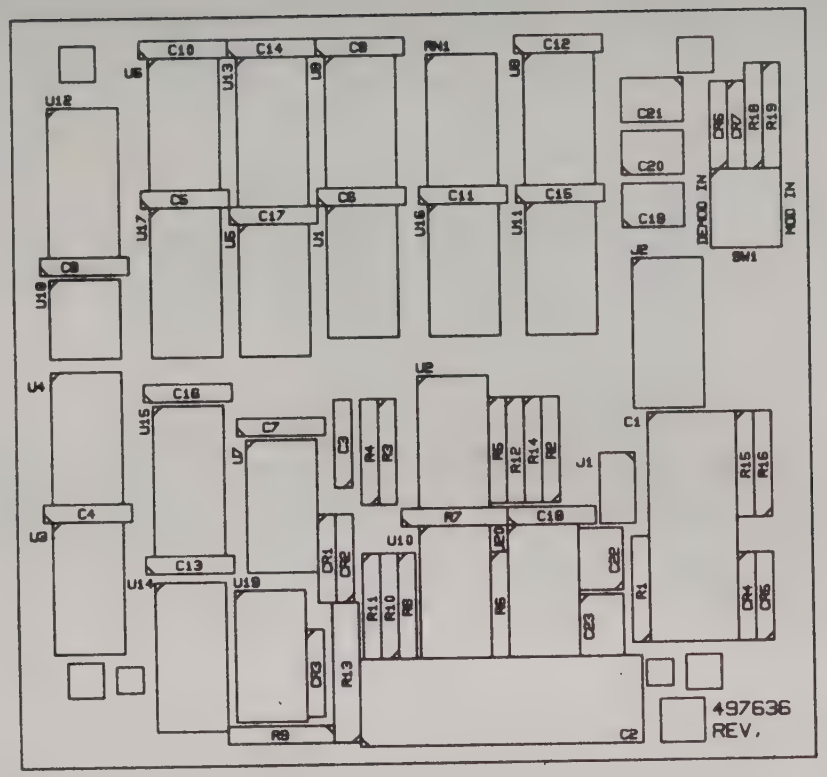


FIGURE 4-22 IRIG INTERFACE BD.

RS 3200 & RS 3400
PC BOARD ASSY., CONTROLLER 897637
FIGURE 4-23

DESIGNATION	PART NUMBER	DESCRIPTION
C1	283943-476	Capacitor 47UF
C2-C4	240352-200	Capacitor 20PF
C5-C45	288755-103	Capacitor 0.01UF
CR1-CR3	280440	Diode 1N4148
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
J1	Not Used	
J2	296508-37	Connector (A-P)
	31-119918-4005	Screw
	1-216741-411	Lockwasher
	31-129647-40	Nut
		----- * -----
Q1	Not Used	
Q2	286141	Transistor 2N3904
R1	CL-210099-1002	Resistor 10K
R2	Not Used	
R3-R5	CL-210099-1002	Resistor 10K
R6	Not Used	
R7	CL-210099-1002	Resistor 10K
R8	5-241111-472	Resistor 4.7K
R9	5-241111-201	Resistor 200 Ohms
R10,R11	5-241111-472	Resistor 4.7K
SW1	297965-4	DIP Switch
U1	296110	I.C. 6809P
U2	Not Used	
u3	296674-244	I.C. 74HC244
U4	296674-245	I.C. 74HC245
U5,U6	296674-138	I.C. 74HC138
U7	296674-154	I.C. 74HC175
U8	296674-74	I.C. 74HC74
U9	CL-711586-1	I.C. Programmed
U10	297990	I.C. X2004
U11	297978	I.C. 58274
U12	CL-210013	I.C. 8254

DESIGNATION	PART NUMBER	DESCRIPTION
U13	296674-160	I.C. 74HC160
U14,15	296674-00	I.C. 74HC00
U16	296674-02	I.C. 74HC02
U17	296674-10	I.C. 74HC10
U18	Not Used	
U19	296674-273	I.C. 74HC273
U20	289759	I.C. MC1413P
U21	296674-244	I.C. 74HC244
U22	296674-126	I.C. 74HC126
U23	296674-14	I.C. 74HC14
U24	296674-74	I.C. 74HC74
U25	CL-210009	I.C. 7542
U26	296674-21	I.C. 74HC21
U27	296674-244	I.C. 74HC244
U28	296119-2	I.C. LF412
U29	294786-1	I.C. LM393
U30	296674-244	I.C. 74HC244
U31	296674-14	I.C. 74HC14
U32	296674-08	I.C. 74HC08
U33,U34	296378	I.C. RDD104
U35	296674-107	I.C. 74HC107
U36	296674-74	I.C. 74HC74
U37	296674-4020	I.C. 74HC4020
U38	Not Used	
U39	296674-74	I.C. 74HC74
U40	296363-1	I.C. 2KXBRAM
U41	296674-368	I.C. 74HC368
U42	296674-646	I.C. 74HC646
X1	288487-24	Socket 24 pin
X2	288487-28	Socket 28 pin
XU1-XU3	1-283274-102	Resistor Network 1K
XU4	1-283274-472	Resistor Network 4.7K
Y1	296519-1	Crystal 4MHZ

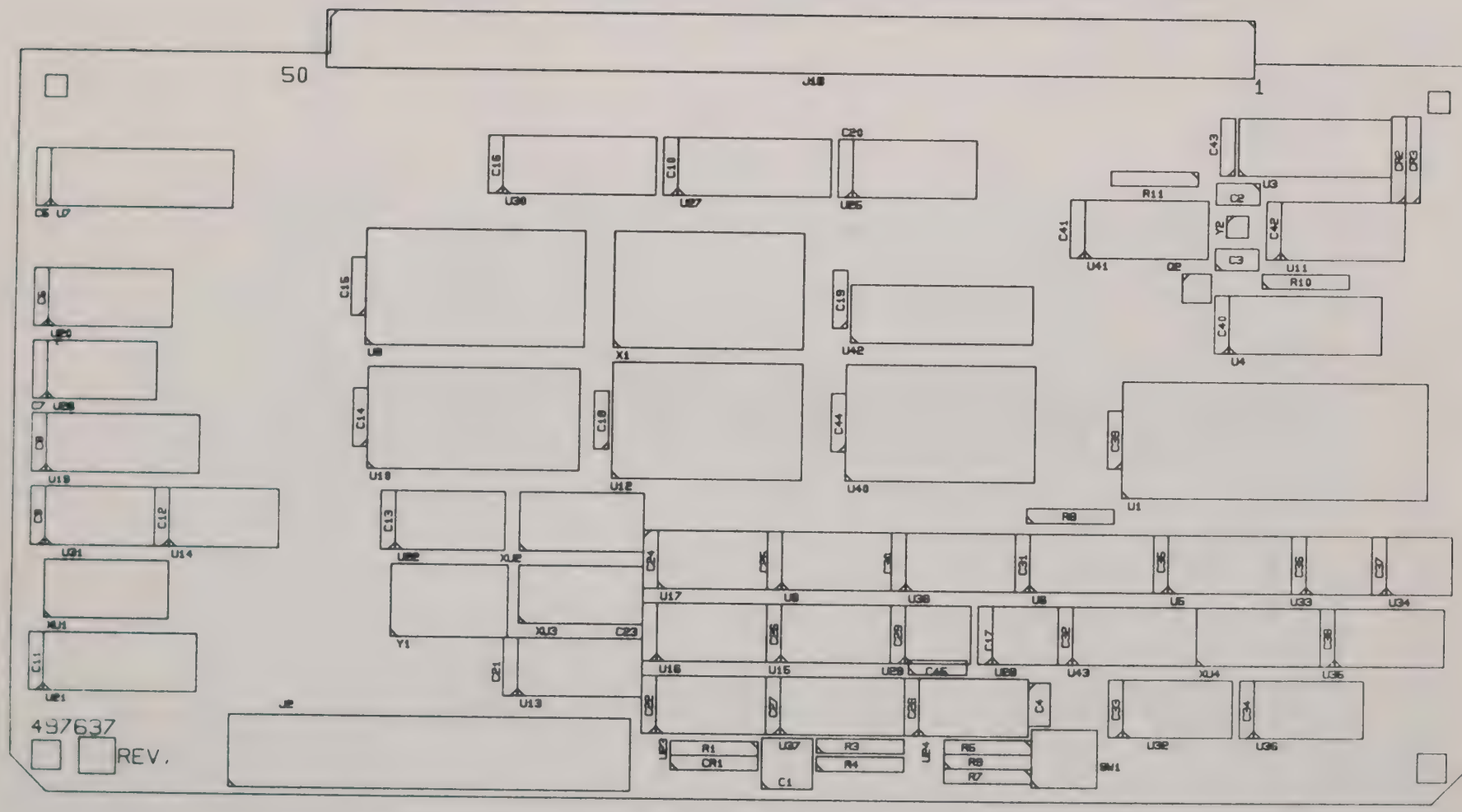
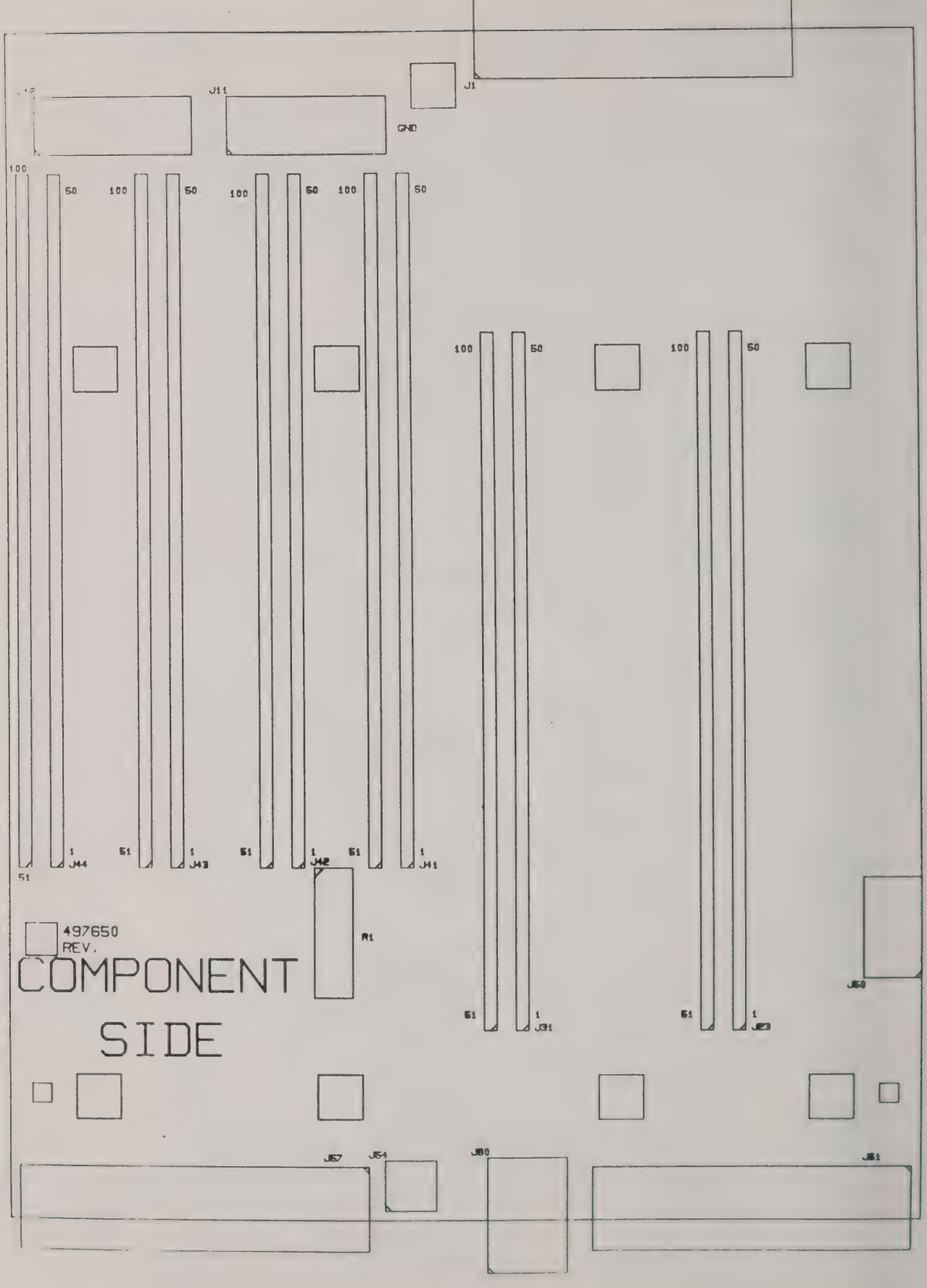


FIGURE 4-23 CONTROLLER BD.

DESIGNATION	PART NUMBER	DESCRIPTION
J1	1-292529-40	Connector (A-P)
	31-119918-2607	Screw, Pan Head
	1-216741-401	Lockwasher
	243104-5	Washer
	31-119998-26	Nut
		----- * -----
J2-J10	Not Used	
J11,J12	294063-8	Connector (A-P)
	CL-310567	Locater
		----- * -----
J13-J22	Not Used	
J23	297981-50	Connector
J24-J30	Not Used	
J31	297987-50	Connector
J32-J40	Not Used	
J41-J44	297981-50	Connector
J45-J49	Not Used	
J50	281711-5	Connector
J51	1-292529-40	Connector (A-P)
	31-119918-2607	Screw, Pan Head
	1-216741-401	Lockwasher
	243104-5	Washer
	31-119998-26	Nut
		----- * -----
J52,J53	Not Used	
J54	294310-4	Connector
J55,J56	Not Used	
J57	1-292529-40	Connector (A-P)
	31-119918-2607	Screw, Pan Head
	1-216741-401	Lockwasher
	243104-5	Washer
	31-119998-26	Nut
		----- * -----
J58,J59	Not Used	
J60	294063-4	Connector
R1	5-115559-100	Resistor 10 Ohms


J11
J1
GND
100
50
100
50
100
50
100
50
100
50
100
50
51
1
J44
51
1
J43
51
1
J42
51
1
J41
51
1
J31
51
1
J32
J60
R1
497650
REV.
COMPONENT
SIDE
J57
J54
J80
J61

DESIGNATION	PART NUMBER	DESCRIPTION
J1	1-292529-40	Connector (A-P)
	31-119918-2607	Screw, Pan Head
	1-216741-401	Lockwasher
	243104-5	Washer
	31-119998-26	Nut
		----- * -----
J2-J10	Not Used	
J11-J14	294063-8	Connector (A-P)
	CL-310567	Locater
		----- * -----
J15-J21	Not Used	
J22,J23	297981-50	Connector
J24-J30	Not Used	
J31	297987-50	Connector
J32-J40	Not Used	
J41-J45	297981-50	Connector
J46-J49	Not Used	
J50	281711-5	Connector
J51	Not Used	
J52	1-292529-40	Connector (A-P)
	31-119918-2607	Screw, Pan Head
	1-216741-401	Lockwasher
	243104-5	Washer
	31-119998-26	Nut
		----- * -----
J52,J53	Not Used	
J54,J55	294310-4	Connector
J56	Not Used	
J57	1-292529-40	Connector (A-P)
	31-119918-2607	Screw, Pan Head
	1-216741-401	Lockwasher
	243104-5	Washer
	31-119998-26	Nut
		----- * -----
J58,J59	Not Used	
J60	294063-4	Connector
R1,R2	5-115559-100	Resistor 10 Ohms

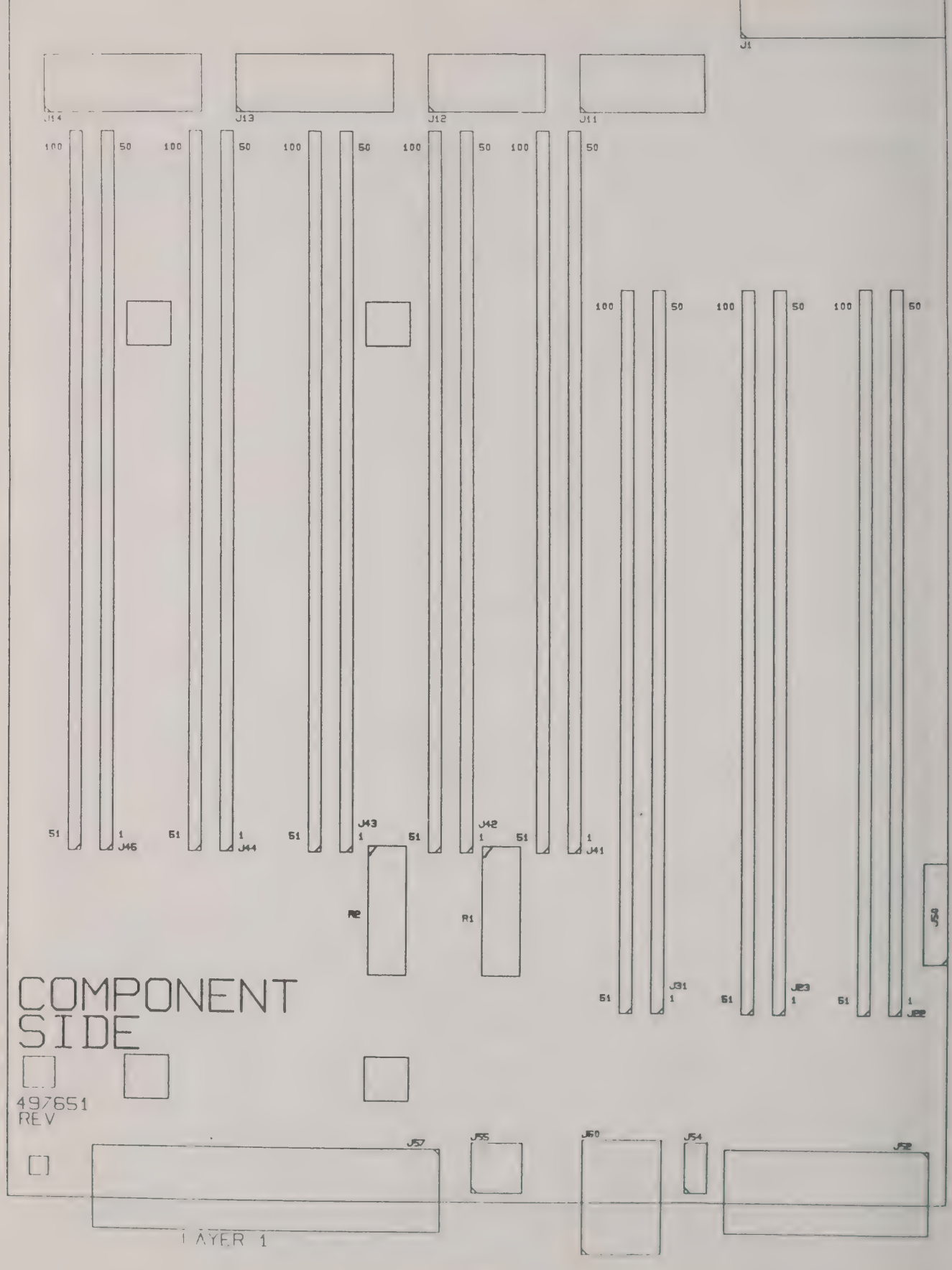


FIGURE 4-25 RS 3400 MOTHER BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C1	10-288757-20	Capacitor 22PF
C2,C3	288755-104	Capacitor 0.1UF
C4,C5	294678-391	Capacitor 390PF
C6	288755-104	Capacitor 0.1MF
C7,C8	28755-102	Capacitor 100PF
C9-C11	Not Used	
C12,C13	283943-106	Capacitor 10UF
C14,C15	263386-108	Capacitor 1000UF
C16-C19	Not Used	
C20-C25	287614-104	Capacitor 0.1UF
C26-C36	287614-104	Capacitor 0.1UF
C37,C38	287614-104	Capacitor 0.1UF
CR1-CR5	280440	Diode 1N4148
CR6-CR13	CL-210393-1	Diode MUR405
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
F1	11619814	Fuse 5 Amp
FC1,FC2	285577	Fuse Clip
L1,L2	CL-210391-2	Inductor 10MH
L3	CL-210391-1	Inductor 100MH
R1,R2	CL-210099-4991	Resistor 4.99K
R3	CL-210099-7501	Resistor 7.5K
R4	CL-210099-2001	Resistor 2K
R5	CL-210099-3001	Resistor 3K
R6,R7	CL-210099-1003	Resistor 100K
R8	Not Used	
R9	CL-210099-1001	Resistor 1K
R10	Not Used	
R11	CL-210099-2001	Resistor 2.2K
R12	CL-210099-3301	Resistor 3.3K
R13	CL-210099-1002	Resistor 10K
R14-R16	Not Used	
R17	CL-210099-4701	Resistor 4.7K
R18	CL-210099-1002	Resistor 10K
R19-R21	Not Used	
R22	CL-210099-2201	Resistor 2.2K
R23	CL-210099-3301	Resistor 3.3K
R24	CL-210099-1002	Resistor 10K
R25	CL-210099-1004	Resistor 1 Meg
R26	CL-210099-1001	Resistor 1K

DESIGNATION	PART NUMBER	DESCRIPTION
R27	293941-203	Poteniometer 20K
R28	CL-210099-4701	Resistor 4.7K
R29	Not Used	
R30	CL-210099-4701	Resistor 4.7K
R31	CL-210099-1002	Resistor 10K
R32-R34	Not Used	
R35	CL-210099-4701	Resistor 4.7K
R36-R42	Not Used	
R43	293941-502	Poteniometer 5K
R44	CL-210099-6001	Resistor 6K
R45-R48	Not Used	
R49,R50	1-130340-0R1	Resistor 0.1 Ohm
R51-R54	Not Used	
R55	CL-210099-2003	Resistor 200K
R56,R57	CL-21099-1002	Resistor 10K
R58	CL-210099-2003	Resistor 200K
R59-R61	CL-210099-1002	Resistor 10K
RN1,RN2	296511-103	SIP Resistor Network 10K
RN3,RN4	3-283274-101	DIP Resistor Network 100 Ohms
RN5	3-283274-472	DIP Resistor Network 10K
RN6-RN8	3-283274-104	DIP Resistor Network 10K
RN9,RN10	297492	DIP Resistor Network 10K
TP1-TP6	265763-3	Contact
U1-U4	296674-541	I.C. 74HC541
U5	296674-32	I.C. 74HC32
U6	296674-139	I.C. 74HC139
U7	296674-04	I.C. 74HC04
U8	296674-125	I.C. 74HC125
U9	296674-74	I.C. 74HC74
U10	CL-210009	I.C. AD7542
U11	291952	I.C. OP-07BI
U12	296275-1	I.C. LF411ACN
U13	CL-210013	I.C. 8254
U14	296674-393	I.C. 74HC393
U15	CL-611024	I.C. Programmed

DESIGNATION	PART NUMBER	DESCRIPTION
U16	296678	I.C. Voltage Ref LH0070
U17	296674-74	I.C. 74HC74
U18	291062-3	I.C. TL084CN
U19,U20	CL-611025	I.C. Programmed
U21,U22	293085	I.C. AD7524
U23	Not Used	
U24	296674-393	I.C. 74HC393
U25	Not Used	
U26	296674-74	I.C. 74HC74
U27	296674-86	I.C. 74HC86
U28	290169-26	I.C. 74LS26
U29,U30	296674-273	I.C. 74HC273
U31,U32	Not Used	
U33	286146	I.C. LM339N
U34	Not Used	
U35	291062-3	I.C. TL084CN
U36	Not Used	
U37	293086	I.C. LM331AN
U38	291062-3	I.C. TL084CN
U39,U40	293093	Transistor Array MPQ3906
U41	Not Used	
U42,U44	293094	Transistor Array MPQ3906
U45,U46	CL-210381	I.C. IRFT-003 (A-P)
	CL-210726	Heat Sink
	293848-10	Insulator
	31-119918-2606	Screw
	1-120052-201	Lockwasher
	31-119998-26	Nut
		----- * -----
U47	290169-26	I.C. 74LS26
U48	285317	I.C. Voltage Reg 7805 (A-P)
	293324-1	Heat Sink
	293848-3	Insulator
	31-119918-4006	Screw
	1-216741-410	Lockwasher
	31-119998-40	Nut
		----- * -----
XU1	292709-24	Socket 24 pin
XU2,XU3	292709-16	Socket 16 pin
XU4	292709-20	Socket 20 pin

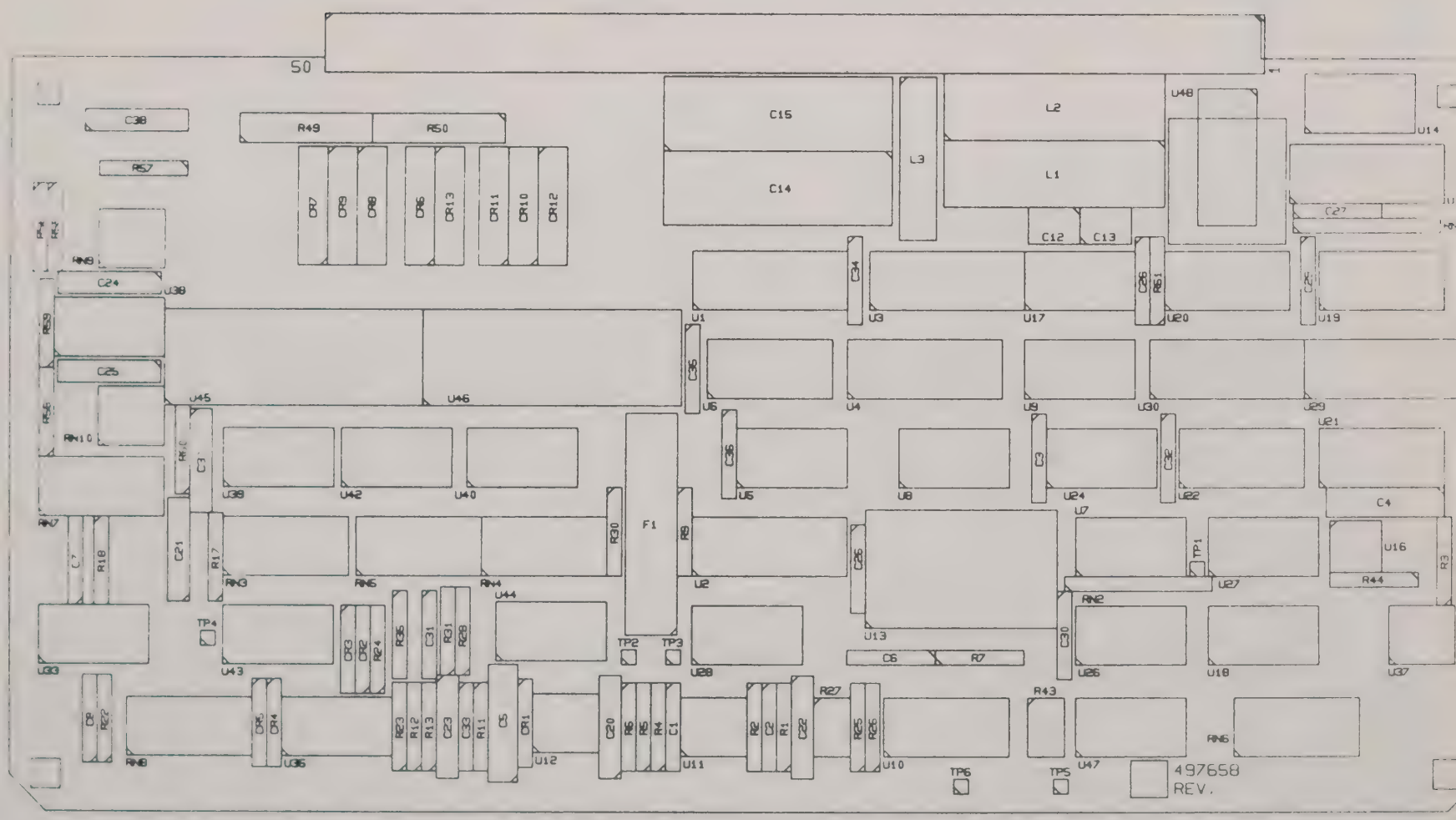


FIGURE 4-26 CHART DRIVE BD.

RS 3200 & RS 3400
PC BOARD ASSY., IEEE-488 INTERFACE 897727
FIGURE 4-27

DESIGNATION	PART NUMBER	DESCRIPTION
C1-C2	Not Used	
C3	288755-104	Capacitor 0.1UF
C4	Not Used	
C5	288755-104	Capacitor 0.1UF
C6	Not Used	
C7	288755-104	Capacitor 0.1uf
C8	Not Used	
C9	288755-104	Capacitor 0.1UF
C10	Not Used	
C11	288755-104	Capacitor 0.1UF
C12-C15	Not Used	
C16	288755-104	Capacitor 0.1UF
C17	Not Used	
C18	288755-104	Capacitor 0.1UF
C19	Not Used	
C20,C21	28755-104	Capacitor 0.1UF
C22-C25	Not Used	
C26-C28	28755-104	Capacitor 0.1UF
C29-C39	Not Used	
C40	283943-106	Capacitor 10UF
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
J1	CL-210286	Connector (A-P)
	31-119918-4005	Screw
		----- * -----
J2	296509-37	Connector (A-P)
	31-119918-4005	Screw
	1-216741-411	Lockwasher
	31-129647-40	Nut
		----- * -----
J3	298040	BNC Connector
RP1	3-283274-102	Resistor Network 1K
RP2	4-283274-103	Resistor Network 10K
RP3	2-283274-102	Resistor Network 1K
SW1	286142-8	DIP Switch

DESIGNATION	PART NUMBER	DESCRIPTION
SW2	Not Used	
SW3	286142-3	DIP Switch
U1	296110	I.C. 6809P
U2	292139	I.C. 8255A
U3	Not Used	
U4	296674-244	I.C. 74HC244
U5	Not Used	
U6	296363-1	I.C. 6516
U7	CL-611652-01	I.C. Programmed
U8	296674-154	I.C. 74HC154
U9	296674-139	I.C. 74HC139
U10	296674-244	I.C. 74HC244
U11	Not Used	
U12	296109	I.C. 8291A
U13-U16	296111	I.C. 344B
U17	Not Used	
U18	296674-126	I.C. 74HC126
U19	Not Used	
U20	296674-11	I.C. 74HC11
U21	296674-00	I.C. 74HC00
U22,U23	296674-04	I.C. 74HC04
X1-X14	Not Used	
X15	288487-24	Socket 24 pin
X16-X23	Not Used	
X24	288487-24	Socket 24 pin
X25	285593-16	Socket 16 pin

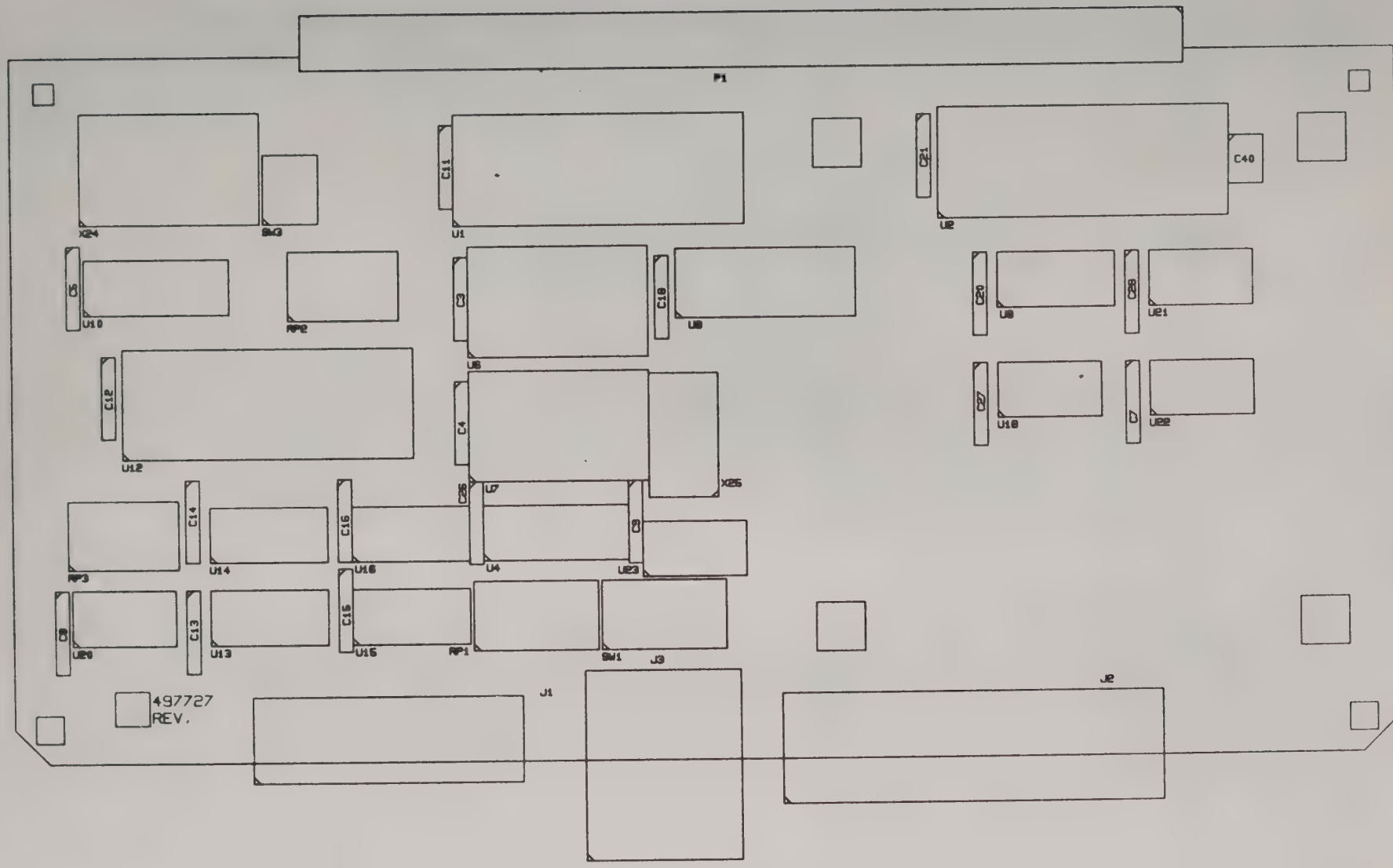


FIGURE 4-27 IEEE-488 INTERFACE BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C1	Not Used	
C2-C5	288755-104	Capacitor 0.1UF
C6	Not Used	
C7-C11	288755-104	Capacitor 0.1UF
C12-C17	Not Used	
C18	288755-104	Capacitor 0.1UF
C19	Not Used	
C20-C22	288755-104	Capacitor 0.1UF
C23-C25	Not Used	
C26-C28	288755-104	Capacitor 0.1UF
C29-C39	Not Used	
C40	283943-106	Capacitor 10UF
C41-C49	Not Used	
C50	240352-300	Capacitor 30PF
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
J1	296509-25	Connector (A-P)
	31-119918-4005	Screw
	1-216741-411	Lockwasher
	31-129647-40	Nut
		----- * -----
J2	296509-37	Connector (A-P)
	31-119918-4005	Screw
	1-216741-411	Lockwasher
	31-129647-40	Nut
		----- * -----
J3	298040	BNC Connector
RP1	3-283274-102	Resistor Network 1K
RP2	4-283274-103	Resistor Network 10K
RP3	2-283274-102	Resistor Network 1K
SW1	286142-8	DIP Switch
SW2	1-195641-1	Switch DPST
SW3	286142-3	DIP Switch

DESIGNATION	PART NUMBER	DESCRIPTION
U1	296110	I.C. 6809P
U2	292139	I.C. 82554
U3	Not Used	
U4	296674-244	I.C. 74HC244
U5	Not Used	
U6	296363-1	I.C. 6516
U7	CL-611651-02	I.C. Programmed
U8	296674-154	I.C. 74HC154
U9	296674-139	i.c. 74HC139
U10-U17	Not Used	
U18	296674-126	I.C. 74HC126
U19	Not Used	
U20	296674-11	I.C. 74HC11
U21	296674-00	I.C. 74HC00
U22	290169-04	I.C. 74LS04
U23	296674-04	I.C. 74HC04
U24,U25	Not Used	
U26	295654	I.C. 1488
U27	295653	I.C. 1489
U28,U29	Not Used	
U30	CL-210010	I.C. 65C51
X1-X6	Not Used	
X7	288487-24	Socket 24 pin
X8-X23	Not Used	
X24	288487-24	Socket 24 pin
X25	285593-16	Socket 16 pin
Y1	289053-14	Crystal 1.8432MHZ

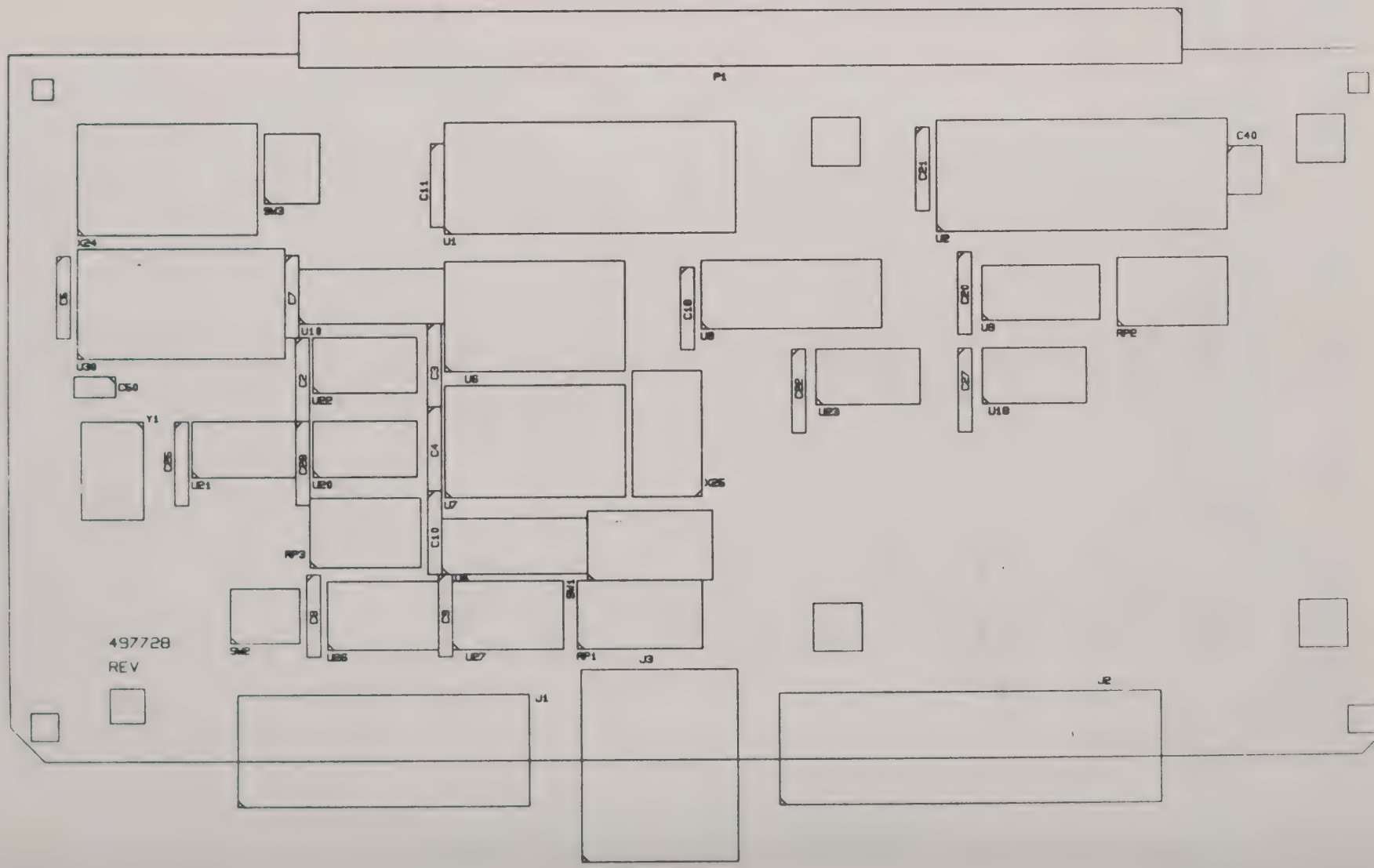


FIGURE 4-28 RS-232 INTERFACE BD.

RS 3200 & RS 3400
PC BOARD ASSY., PEN HEAT CONTROL 897809-1
FIGURE 4-29

DESIGNATION	PART NUMBER	DESCRIPTION
C1	287614-471	Capacitor 470PF
C2	287614-224	Capacitor 0.22UF
C3	262585-475	Capacitor 4.7UF
C5-C8	Not Used	
C9	287614-471	Capacitor 470PF
C10	287614-333	Capacitor 0.033UF
C11-C15	Not Used	
C16	287614-471	Capacitor 470PF
C17	287614-333	Capacitor 0.033UF
C18-C20	Not Used	
C21	287614-471	Capacitor 470PF
C22	287614-333	Capacitor 0.033UF
C23-C25	Not Used	
C26	287614-471	Capacitor 470PF
C27	287614-333	Capacitor 0.033UF
C28	Not Used	
C29	288755-104	Capacitor 0.1UF
C30	262585-475	Capacitor 4.7UF
C31	295152-686	Capacitor 68UF
C32	Not Used	
C33-C36	288755-224	Capacitor 0.22UF
C37-C39	288755-104	Capacitor 0.1UF
CB1	297966-3	Circuit Breaker
CR1-CR4	263727	Diode 1N6000B
JA-JD	CL-611874	Module Assy. Pen Adapter
		(A-P)
	297481-24	I.C. Socket 24 pin
		----- * -----
J1-J4	293983-2	Connector 2 pin
R1	CL-210353-2	Resistor 2K

DESIGNATION	PART NUMBER	DESCRIPTION
R2	CL-210353-1	Resistor 2K
R3	CL-210353-2	Resistor 2K
R4	CL-210353-1	Resistor 2K
R5	CL-210099-7500	Resistor 750 Ohms
R6	CL-210099-6801	Resistor 6.8K
R7	CL-210099-2701	Resistor 2.7K
R8	CL-210099-7501	Resistor 7.5K
R9	Not Used	
R10	269085-503	Resistor 50K
R11-R13	CL-210099-1002	Resistor 10K
R14	CL-210096-5001	Resistor 5K
R15	CL-210099-4753	Resistor 475K
R16	267235	Jumper
R17	Not Used	
R18	269085-502	Resistor 5K
R19-R21	Not Used	
R22	1-281851-1R000	Resistor 1 Ohm
R23-R25	CL-210099-1002	Resistor 10K
R26	CL-210096-5001	Resistor 5K
R27	CL-210099-4753	Resistor 475K
R28	267235	Jumper
R29	Not Used	
R30	269085-502	Resistor 5K
R31-R33	Not Used	
R34	1-281851-1R000	Resistor 1 Ohm
R35	1-281851-20003	Resistor 2 Meg
R36	267235	Jumper
R37-R42	Not Used	
R43	267235	Jumper
R44,R45	Not Used	

DESIGNATION	PART NUMBER	DESCRIPTION
R46	1-281851-1R000	Resistor 1 Ohm
R47	1-281851-20003	Resistor 2 Meg
R48	267235	Jumper
R49-R53	Not Used	
R54	267235	Jumper
R55-R58	Not Used	
R59	1-281851-1R000	Resistor 1 Ohm
R60	269085-502	Resistor 5K
R61	Not Used	
R62	269085-502	Resistor 5K
R63	Not Used	
R64	CL-210099-7500	Resistor 750 Ohms
RN1	Not Used	
RN2,RN3	CL-210216-102	Resistor Network 1K
RN4,RN5	Not Used	
RN6	CL-211433-603	Resistor Network 60K
RN7	CL-211433-403	Resistor Network 40K
RN8	CL-210216-103	Resistor Network 10K
RN9,RN10	CL-211433-103	Resistor Network 10K
U1	CL-210224	I.C. LM2917
U2	297307-3	I.C. LF13333
U3-U5	CL-210226-1	I.C. LT1013DN8
U6-U9	CL-210225	I.C. LM3524
U10	296613	I.C. MPQ3725
U11	296603	I.C. FSA2619P
U12	289897	I.C. MC79L05CP
U13,U14	CL-210226-1	I.C. LT1013DN8
	CL-610876	Foam Strip
	249438-13	Spacer/Standoff

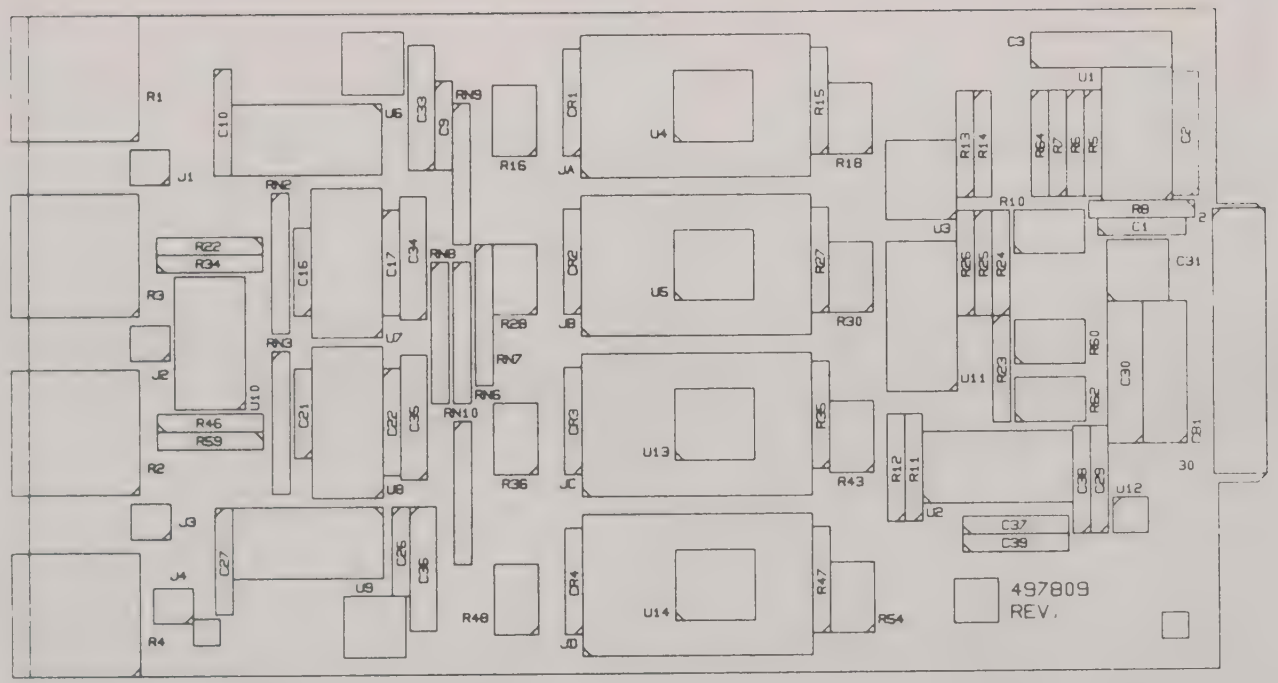


FIGURE 4-29 PEN HEAT CONTROL BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C101-C116	Not Used	
C117-C119	288755-104	Capacitor 0.1UF
C120	283943-107	Capacitor 100UF
C121	Not Used	
C122	263386-108	Capacitor 1000UF
C123,C124	288755-104	Capacitor 0.1UF
C125	10-288757-221	Capacitor 220PF
D101	269256-7	Diode 1N4007
D102-D107	296616	Diode 1N5818
D108-D129	Not Used	
D130-D136	269256-7	Diode 1N4007
D137	5-244922-20	Zener Diode 17V
FB1-FB12	Not Used	
FB13,FB14	297712	Ferrite Bead
J101-J103	Not Used	
J-104	292715-15	Connector (A-P)
	31-119918-4008	Screw
	243104-5	Washer
	1-216741-401	Lockwasher
	31-119998-26	Nut
		----- * -----
J105-J107	Not Used	
J108	292715-15	Connector (A-P)
	31-119918-4008	Screw
	243104-5	Washer
	1-216741-401	Lockwasher
	31-119998-26	Nut
		----- * -----
J109	294310-4	Connector
J110-J116	Not Used	
J117	294310-4	Connector
J118,J119	Not Used	
J120	1-292529-40	Connector (A-P)
	31-119918-2607	Screw
	243104-5	Washer
	1-216741-401	Lockwasher
	31-119998-26	Nut
		----- * -----
J121	297976-13	Connector
J122-J125	Not Used	

PC BOARD ASSY., RS 3200 MOTHER-IN-LAW 897811-1 (cont.)
FIGURE 4-30

DESIGNATION	PART NUMBER	DESCRIPTION
J126	270270-1	Terminal (A-P)
	16-107283-5	Rivet
		----- * -----
J127,J128	Not Used	
J129	270270-1	Terminal (A-P)
	16-107283-5	Rivet
		----- * -----
J130	1-292529-40	Connector (A-P)
	31-119918-2607	Screw
	243104-5	Washer
	1-216741-401	Lockwasher
	31-119998-26	Nut
		----- * -----
J131	Not Used	
J132	1-292529-10	Connector (A-P)
	31-119918-2607	Screw
	243104-5	Washer
	1-216741-401	Lockwasher
	31-119998-26	Nut
		----- * -----
J133-J139	Not Used	
J140	294310-4	Connector
Q101,Q102	CL-211006	Transistor TIP120 (A-P)
	293324-1	Heat Sink
	293848-3	Insulator,Sil-Pad
	31-119918-4006	Screw, Pan Head
	1-216741-410	Lockwasher
	31-119998-40	Nut
		----- * -----
R101,R102	CL-210099-1002	Resistor 10K
R103-R119	Not Used	
R120,R121	CL-210099-2000	Resistor 200 Ohms
R122	CL-210099-1001	Resistor 1K
R123-R127	Not Used	
R128	5-115558-100	Resistor 10 Ohms
R129	Not Used	
R130,R131	CL-210099-1002	Resistor 10K
R132	CL-210099-2204	Resistor 2.2 Meg
R133	CL-210099-3000	Resistor 300 Ohms
U101-U116	Not Used	
U117	CL-211012	I.C. 75473
U118	296512	I.C. 75472
U119	NOT USED	
U120	296512	I.C. 75472
U121	296674-123	I.C. 74HC123

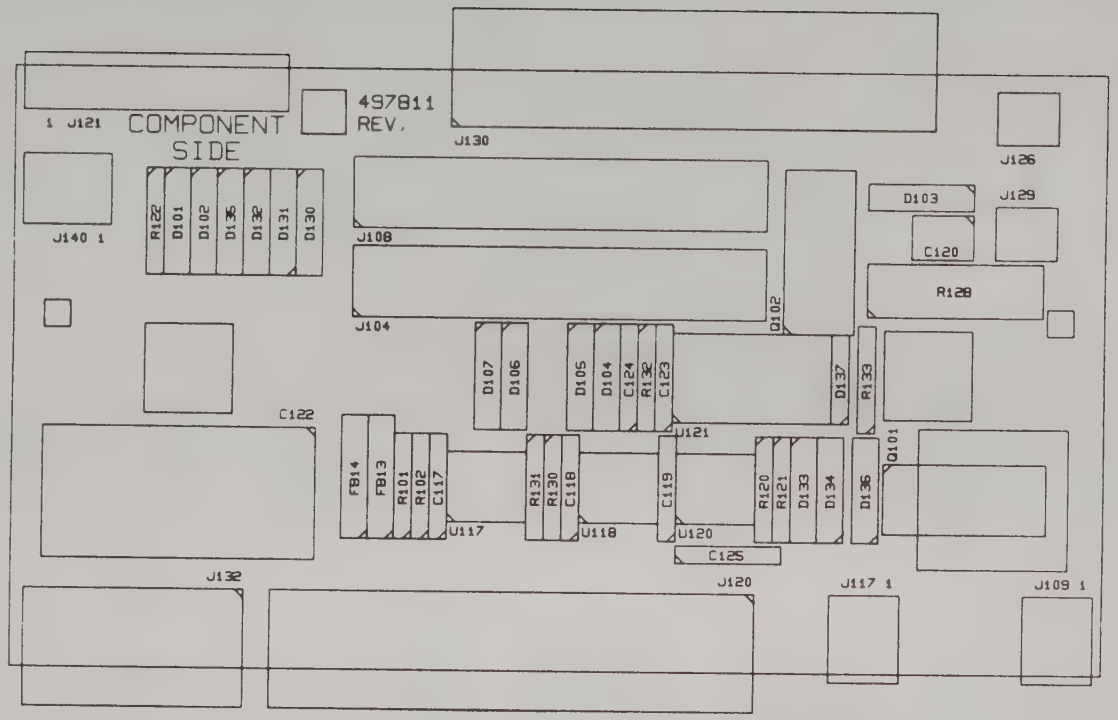


FIGURE 4-30 RS 3200 MOTHER-IN-LAW BD.

RS 3200 & RS 3400
PC BOARD ASSY., RS 3400 MOTHER-IN-LAW 897812-1
FIGURE 4-31

DESIGNATION	PART NUMBER	DESCRIPTION
C101-C114	Not Used	
C115-C119	288755-104	Capacitor 0.1UF
C120	283943-107	Capacitor 100UF
C121	Not Used	
C122	263386-108	Capacitor 1000UF
C123,C124	288755-104	Capacitor 0.1UF
C125	10-288757-221	Capacitor 220PF
D101	269256-7	Diode 1N4007
D102-D111	296616	Diode 1N5818
D112-D129	Not Used	
D130-D136	269256-7	Diode 1N4007
D137	5-244922-20	Zener Diode 17V
FB1-FB8	Not Used	
FB9-FB14	297712	Ferrite Bead
J101,J102	Not Used	
J103,J104	292715-15	Connector (A-P)
	31-119918-4008	Screw
	243104-5	Washer
	1-216741-401	Lockwasher
	31-119998-26	Nut
		----- * -----
J105,J106	Not Used	
J107,J108	292715-15	Connector (A-P)
	31-119918-4008	Screw
	243104-5	Washer
	1-216741-401	Lockwasher
	31-119998-26	Nut
		----- * -----
J109	294310-4	Connector
J110-J114	Not Used	
J115-J117	294310-4	Connector
J118	Not Used	
J119	1-292529-40	Connector (A-P)
	31-119918-2607	Screw
	243104-5	Washer
	1-216741-401	Lockwasher
	31-119998-26	Nut
		----- * -----
J120	Not Used	
J121	297976-13	Connector
J122-J125	Not Used	

DESIGNATION	PART NUMBER	DESCRIPTION
J126	270270-1	Terminal (A-P)
	16-107283-5	Rivet
		----- * -----
J127,J128	Not Used	
J129	270270-1	Terminal (A-P)
	16-107283-5	Rivet
		----- * -----
J130	1-292529-40	Connector (A-P)
	31-119918-2607	Screw
	243104-5	Washer
	1-216741-401	Lockwasher
	31-119998-26	Nut
		----- * -----
J131	Not Used	
J132	1-292529-10	Connector (A-P)
	31-119918-2607	Screw
	243104-5	Washer
	1-216741-401	Lockwasher
	31-119998-26	Nut
		----- * -----
J133-J139	Not Used	
J140	294310-4	Connector
Q101,Q102	CL-211006	Transistor TIP120 (A-P)
	293324-1	Heat Sink
	293848-3	Insulator,Sil-Pad
	31-119918-4006	Screw, Pan Head
	1-216741-410	Lockwasher
	31-119998-40	Nut
		----- * -----
R101-R106	CL-210099-1002	Resistor 10K
R107-R119	Not Used	
R120,R121	CL-210099-2000	Resistor 200 Ohms
R122	CL-210099-1001	Resistor 1K
R123-R127	Not Used	
R128	5-115558-100	Resistor 10 Ohms
R129	Not Used	
R130,R131	CL-210099-1002	Resistor 10K
R132	CL-210099-2204	Resistor 2.2 Meg
R133	CL-210099-3000	Resistor 300 Ohms
U101-U114	Not Used	
U115-U117	CL-211012	I.C. 75473
U118	296512	I.C. 75472
U119	NOT USED	
U120	296512	I.C. 75472
U121	296674-123	I.C. 74HC123

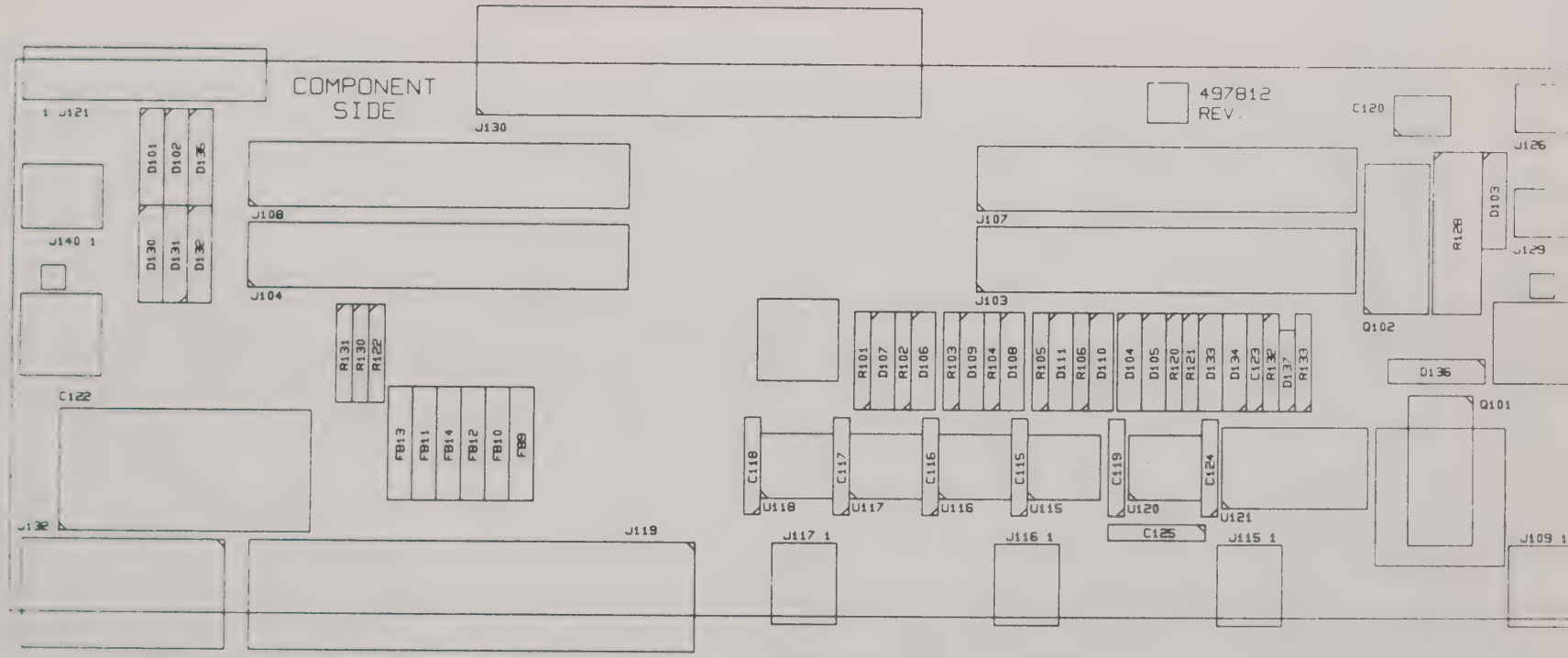


FIGURE 4-31 RS 3400 MOTHER-IN-LAW BD.

RS 3200 & RS 3400
PC BOARD ASSY., RS3200 KEYBOARD 897843-1 & -2
FIGURE 4-32

DESIGNATION	PART NUMBER	DESCRIPTION
C1-C5	288755-104	Capacitor 0.1UF
C6	Not Used	
C7-C14	288755-104	Capacitor 0.1UF
C15	10-263695-105	Capacitor 1.0UF
C16	283943-156	Capacitor 15UF
C17	295462-685	Capacitor 6.8UF
J201	CL-710329	Cably Assembly
L1	291224-1	Inductor 8.2UH
R1	CL-210099-1001	Resistor 1K
SW1-SW16	CL-210198	Switch B3F-4155
SW17-SW47	297909-2	Switch B3F-1152
SW48	Not Used	
SW49-SW52	297902-2	Switch B3F-1152
U1	296674-138	I.C. 74HC138
U2	CL-210194	I.C. 8279
U3	296674-138	I.C. 74HC138
U4	296674-32	I.C. 74HC32
U5,U6	Not Used	
U7	CL-210195	I.C. 74C922
U8	296674-368	I.C. 74HC368
U9	296674-244	I.C. 74HC244
U10-U14	CL-210193	I.C. 75512
VFD	CL-210199	Vacuum Fluorescent Display DC164A2

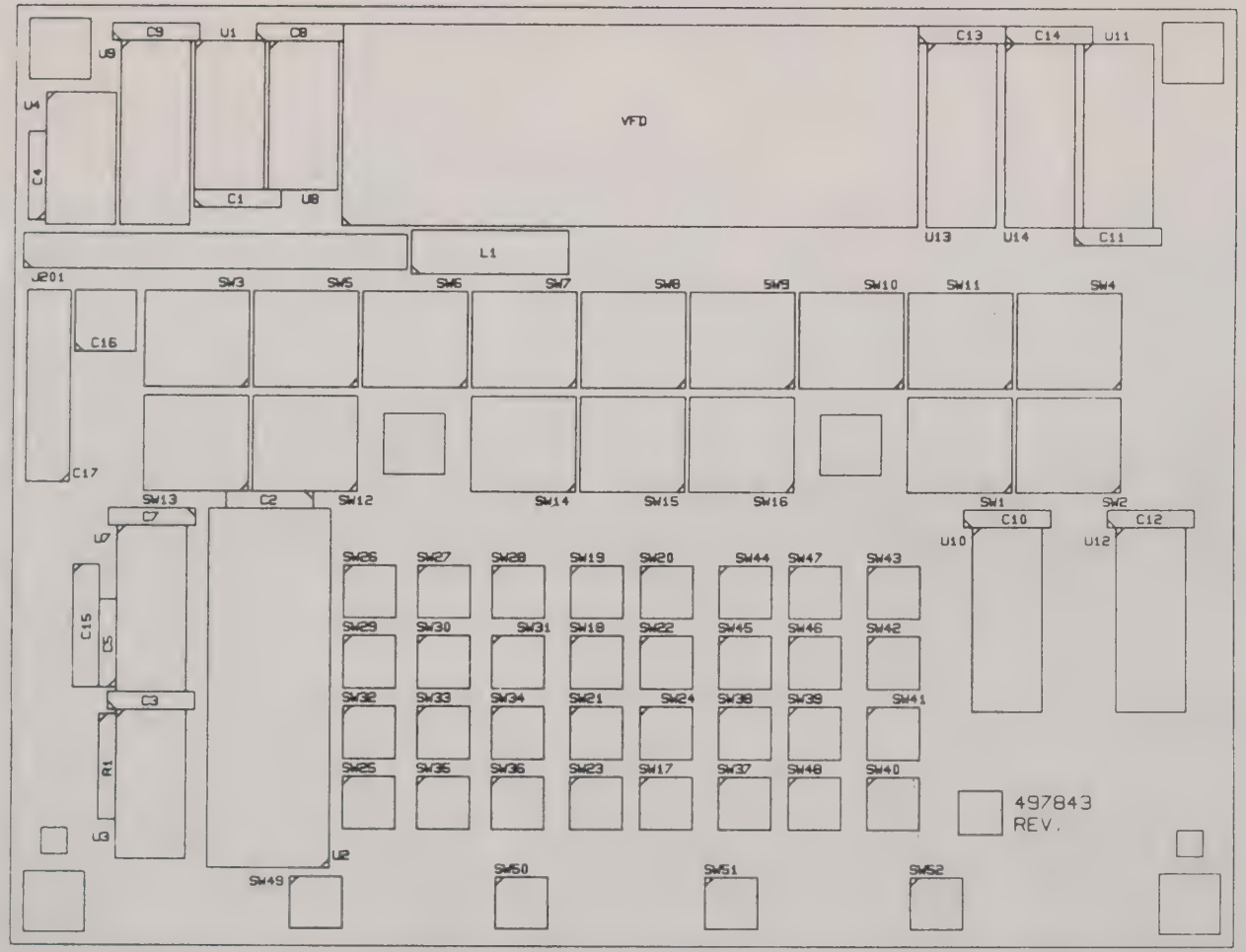


FIGURE 4-32 RS 3200 KEYBOARD BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C1-C5	288755-104	Capacitor 0.1UF
C6	Not Used	
C7-C14	288755-104	Capacitor 0.1UF
C15	10-263695-105	Capacitor 1.0UF
C16	283943-156	Capacitor 15UF
C17	295462-685	Capacitor 6.8UF
J201	CL-710329	Cable Assembly
L1	291224-1	Inductor 8.2UH
R1	CL-210099-1001	Resistor 1k
SW1-SW16	CL-210198	Switch B3F-4155
SW17-SW47	297909-2	Switch B3F-1152
SW48	Not Used	
SW49-SW56	297909-2	Switch B3F-1152
U1	296674-138	I.C. 74HC138
U2	CL-210194	I.C. 8279
U3	296674-138	I.C. 74HC138
U4	296674-32	I.C. 74HC32
U5,U6	Not Used	
U7	CL-210195	I.C. 74C922
U8	29667-368	I.C. 74HC368
U9	296674-244	I.C. 74HC244
U10-U14	CL-210193	I.C. 75512
VFD	CL-210199	Vacuum Fluorescent Display DC164A2

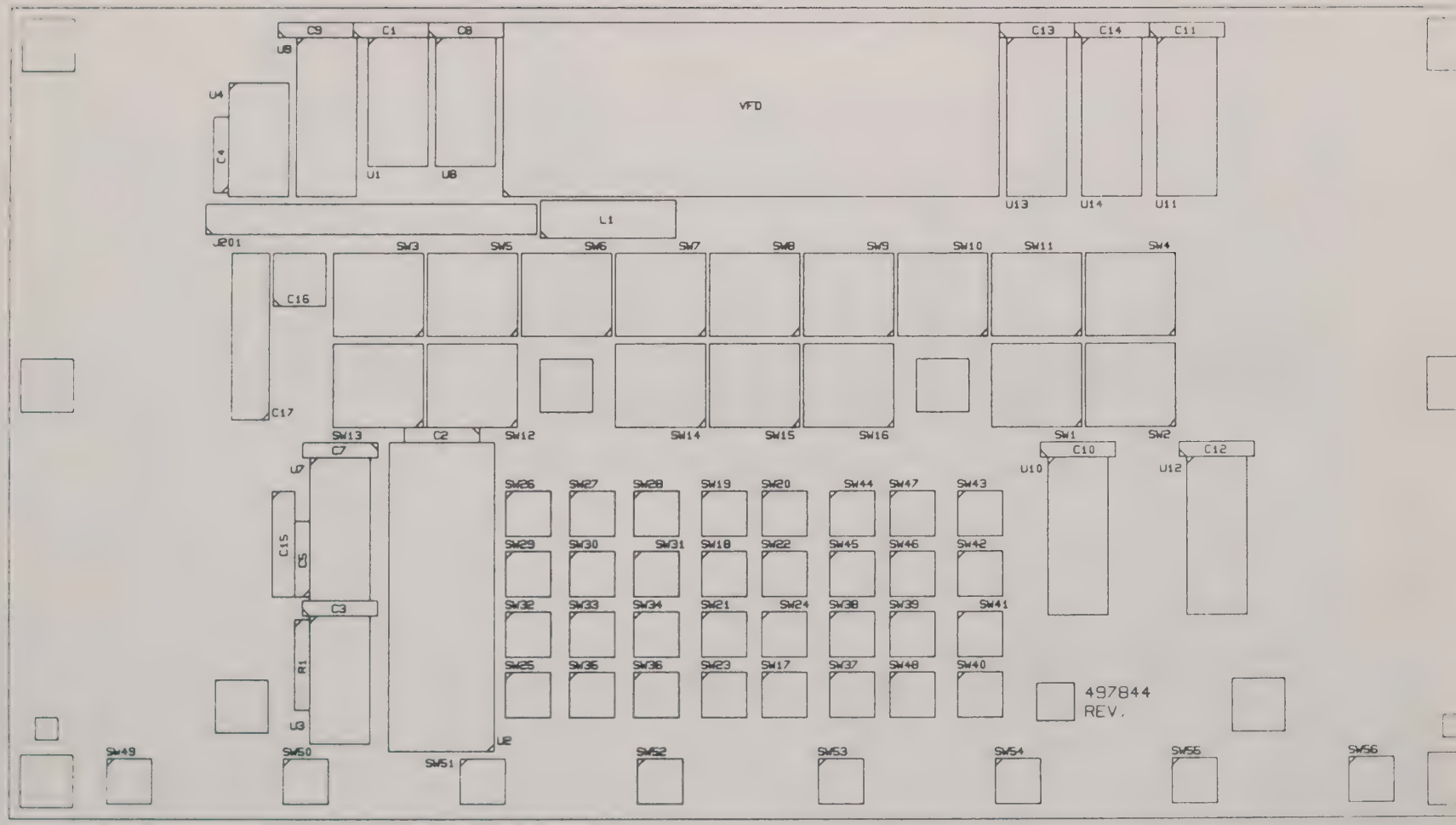


FIGURE 4-33 RS 3400 KEYBOARD BD.

RS 3200 & RS 3400
PC BOARD ASSY., INTERCHANNEL ANNOTATION DRIVER CL-810191
FIGURE 4-34

DESIGNATION	PART NUMBER	DESCRIPTION
C1-C3	288755-103	Capacitor 0.01UF
C4	294666-227	Capacitor 220UF
CR1	269256-7	Diode 1N4007
CR2-CR5	296616	Diode 1N5818
CR6-CR8	2692567	Diode 1N4007
J1,J2	297976-13	Connector
U1,U2	296674-273	I.C. 74HC273
U3,U4	289759	I.C. ULN2003
U5	296674-138	I.C. 74HC138
	249438-13	Spacer

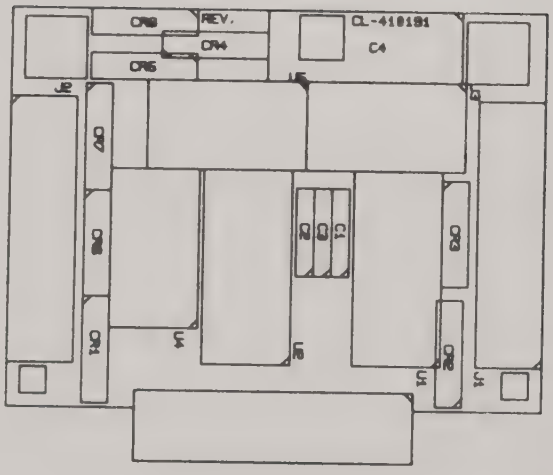


FIGURE 4-34 INTERCHANNEL ANNOTATION DRIVER BD.

RS 3200 & RS 3400
PC BOARD ASSY., PAPER OUT SENSOR CL-810240
FIGURE 4-35

DESIGNATION	PART NUMBER	DESCRIPTION
J1	294310-6	Connector Right Angle
Q1	281702-2	Transistor 2N4401
R1	CL-210099-1002	Resistor 10K
U1	298042	Sensor (A-P)
	243104-5	Insulator Washer
		----- * -----
	247155-40	Clinch Nut

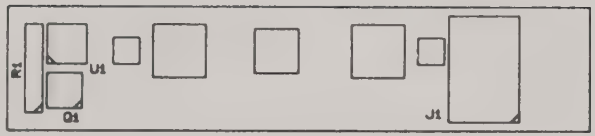


FIGURE 4-35 PAPER OUT SENSOR BD.

RS 3200 & RS 3400
PC BOARD ASSY., SPEED MONITOR CL-810290
FIGURE 4-36

DESIGNATION	PART NUMBER	DESCRIPTION
J1	294310-4	Connector Right Angle
R1	CL-210099-2200	Resistor 220 Ohms
U1	CL-210335-1	Photo Sensor/Emitter

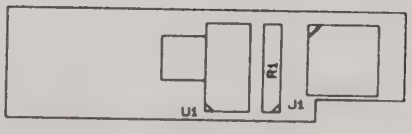


FIGURE 4-36 SPEED MONITOR BD.

RS 3200 & RS 3400
PC BOARD ASSY., RS 3400 INTERCONNECT CL-810438
FIGURE 4-37

DESIGNATION	PART NUMBER	DESCRIPTION
F1-F4	102625-7	Fuse 1 Amp
FC1-FC8	285577	Fuse Clip (Not Shown)
J1-J40	Not Used	
J41	CL-210499-96	Connector (A-P)
	31-119918-2604	Screw
	31-119998-26	Nut
		----- * -----
J42-J71	Not Used	
J72	CL-210499-96	Connector (A-P)
	31-119918-2604	Screw
	31-119998-26	Nut
		----- * -----
P1-P60	Not Used	
P61	294310-8	Connector
P62	1-293983-2	Connector

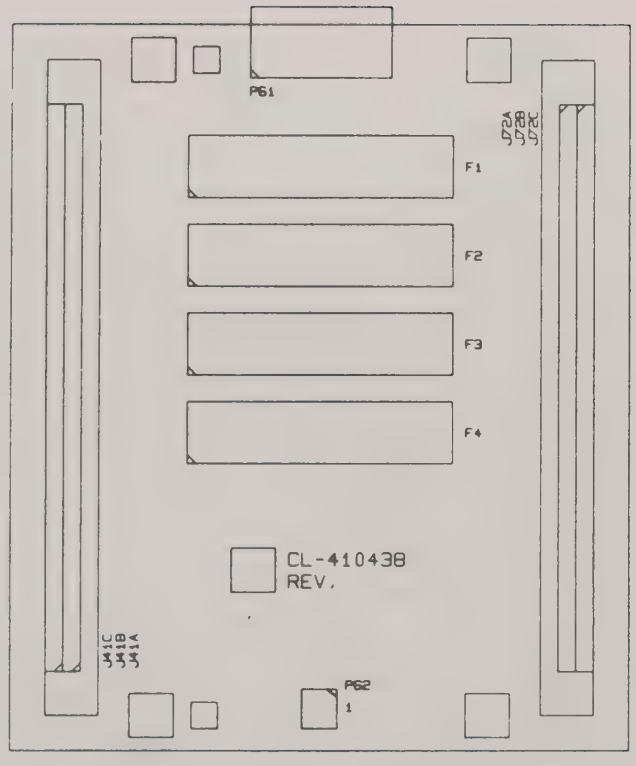


FIGURE 4-37 RS 3400 INTERCONNECT BD.

RS 3200 & RS 3400
PC BOARD ASSY., RS 3400 MEDICAL OUTPUT CL-810439
FIGURE 4-38

DESIGNATION	PART NUMBER	DESCRIPTION
P1-P71	Not Used	
P72	297818-96	Connector (A-P)
	31-119918-2606	Screw
	31-119998-26	Nut
		----- * -----
T1-T4	CL-210356-10	Terminal Block

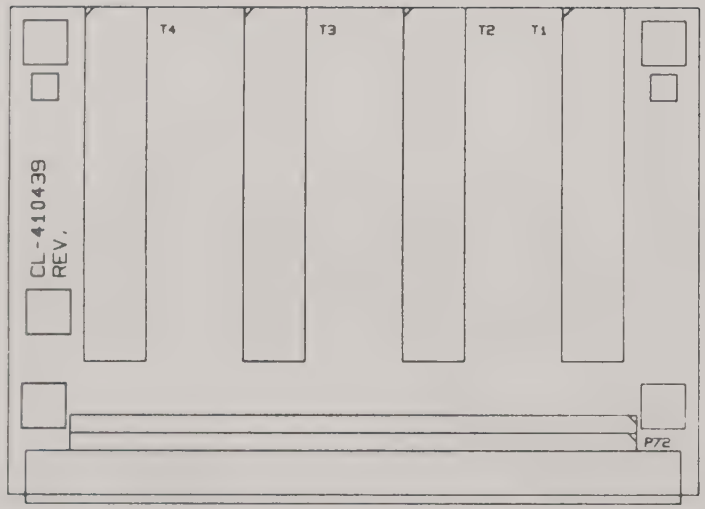


FIGURE 4-38 RS 3400 MEDICAL OUTPUT BD.

DESIGNATION	PART NUMBER	DESCRIPTION
F1,F2	102625-7	Fuse 1 Amp
FC1-FC4	285577	Fuse Clip (Not Shown)
J1-J40	Not Used	
J41	CL-210499-48	Connector (A-P)
	31-119918-2604	Screw
	31-119998-26	Nut
		----- * -----
J42-J71	Not Used	
J72	CL-210499-48	Connector (A-P)
	31-119918-2604	Screw
	31-119998-26	Nut
		----- * -----
P1-P60	Not Used	
P61	294310-8	Connector
P62	1-293983-2	Connector

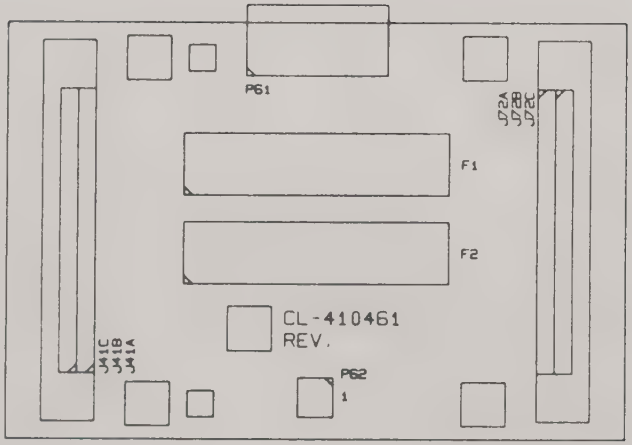


FIGURE 4-39 RS 3200 INTERCONNECT BD.

RS 3200 & RS 3400
PC BOARD ASSY., RS 3200 MEDICAL OUTPUT CL-810462
FIGURE 4-40

DESIGNATION	PART NUMBER	DESCRIPTION
P1-P71	Not Used	
P72	297818-48	Connector (A-P)
	31-119918-2606	Screw
	31-119998-26	Nut
		----- * -----
T1-T2	CL-210356-10	Terminal Block

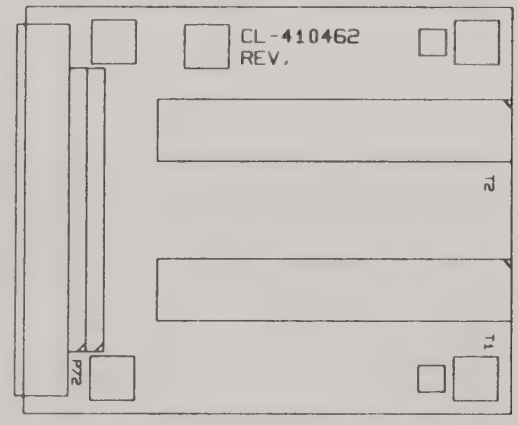


FIGURE 4-40 RS 3200 MEDICAL OUTPUT BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C1,C2	283943-106	Capacitor 10UF
C3	240352-101	Capacitor 100PF
C4-C30	288755-103	Capacitor 0.01UF
C31	240352-101	Capacitor 100PF
CR1	280440	Diode 1N4148
CR2	289396	LED Red LL201R
P1-P51	Not Used	
P52	1-292529-26	Connector (A-P)
	31-119918-2607	Screw
	31-119998-26	Nut
		----- * -----
R1	5-241111-222	Resistor 2.2K
R2,R3	5-241111-103	Resistor 10K
R4	5-241111-331	Resistor 330 Ohms
RP1-RP6	3-283274-103	Resistor Network 10K
SW1	286142-3	DIP Switch
U1	296110	I.C. MC6809P
U2	296519-1	Oscillator K1152A
U3,U4	296674-244	I.C. 74HC244
U5	296674-245	I.C. 74HC245
U6	296674-154	I.C. 74HC154
U7	297977-1	I.C. 27256
U8	296791-3	I.C. HM6264LP-15
U9	CL-210010	I.C. G65SC51P1-1-1 ACIA
U10	296791-3	I.C. HM6264LP-15
U11	296674-373	I.C. 74HC373
U12	296674-151	I.C. 74HC151
U13	296674-30	I.C. 74HC151
U14-U16	296674-244	I.C. 74HC244
U17	296674-646	I.C. 74HC646
U18	296674-74	I.C. 74HC74
U19	296674-30	I.C. 74HC30
U20	296674-126	I.C. 74HC126
U21-U23	296674-04	I.C. 74HC04
U24-U26	296674-00	I.C.74HC00
XU1	288487-24	DIP Socket 24 pin
XU2	288487-28	DIP Socket 28 pin
Y1	289053-14	Crystal 1.8432 Meg Hz

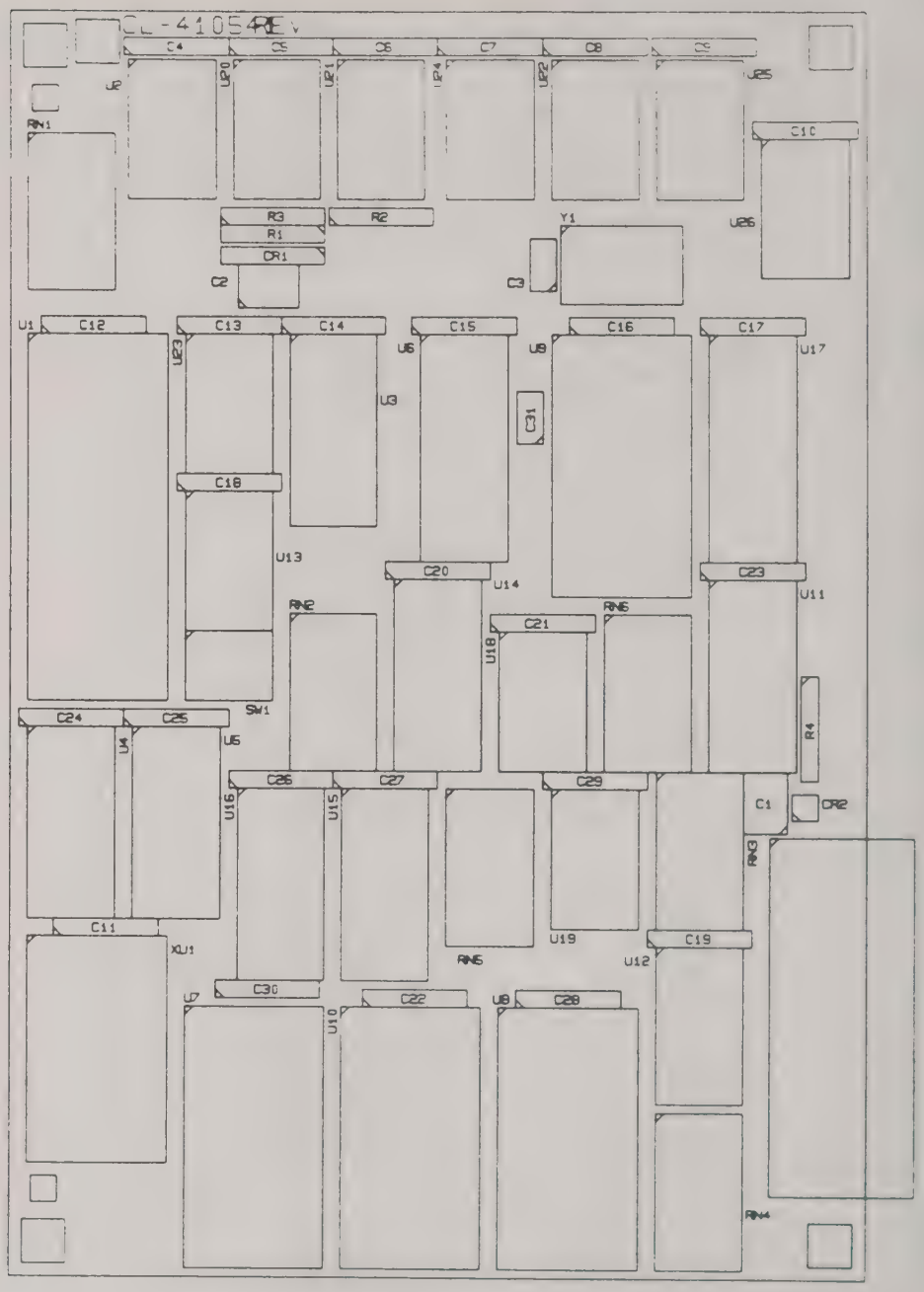


FIGURE 4-41 INTERPRETER BD.

DESIGNATION	PART NUMBER	DESCRIPTION
CR1-CR2	269256-7	Diode 1N4007
J1-J10	Not Used	
J11,J12	CL-210434-8	Connector (A-P)
	31-119918-4008	Screw
	1-123253-802	Standoff
		----- * -----
J13-J20	Not Used	
J21,J22	CL-210209-48	Connector (A-P)
	31-119918-2605	Screw
	31-119998-26	Nut
		----- * -----
P1-P30	Not Used	
P31	1-292529-40	Connector (A-P)
	31-119918-2607	Screw
	31-119998-26	Nut
		----- * -----
P32-P40	Not Used	
P41	CL-210285-48	Connector (A-P)
	31-119918-2607	Screw
	31-119998-26	Nut
		----- * -----
P42-P50	Not Used	
P51	1-292529-26	Connector (A-P)
	31-119918-2607	Screw
	31-119998-26	Nut
		----- * -----
P52-P60	Not Used	
P61	294310-2	Connector

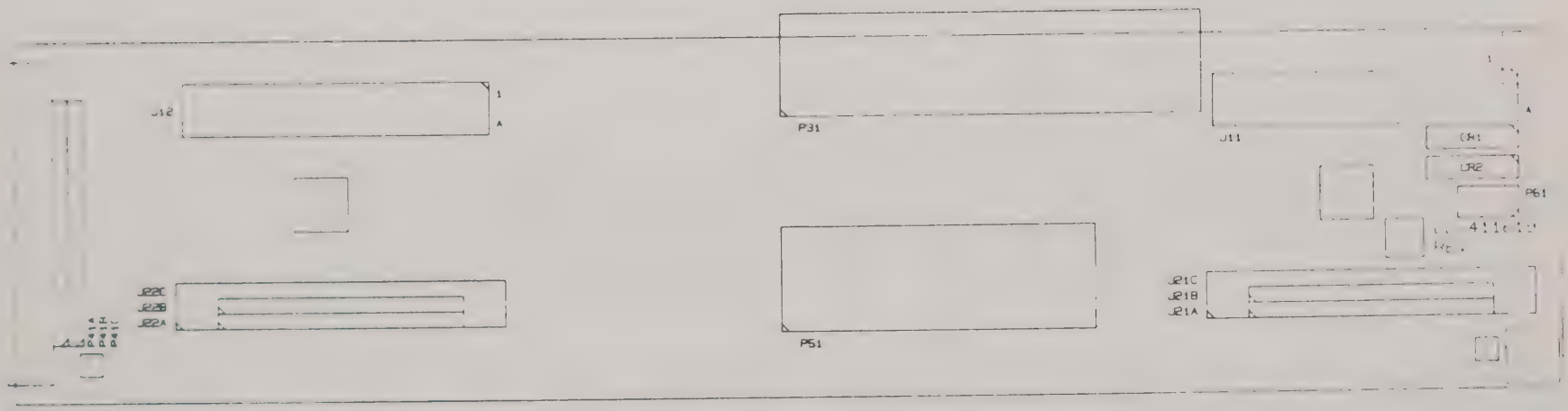


FIGURE 4-42 RS 3200 MOTHER BD. SIGNAL CONDITIONER CAGE

DESIGNATION	PART NUMBER	DESCRIPTION
CR1,CR2	269256-7	Diode 1N4007
J1-J10	Not Used	
J11-J14	CL-210434-8	Connector (A-P)
	31-119918-4008	Screw
	1-123253-802	Standoff
		----- * -----
J15-J20	Not Used	
J21-J24	CL-210209-48	Connector
P1-P30	Not Used	
P31	1-292529-40	Connector (A-P)
	31-119918-2605	Screw
	31-119998-26	Nut
		----- * -----
P32-P40	Not Used	
P41	CL-210285-96	Connector (A-P)
	31-119918-2607	Screw
	31-119998-26	Nut
		----- * -----
P42-P50	Not Used	
P51	1-292529-26	Connector (A-P)
	31-119918-2607	Screw
	31-119998-26	Nut
		----- * -----
P52-P60	Not Used	
P61	294310-2	Connector

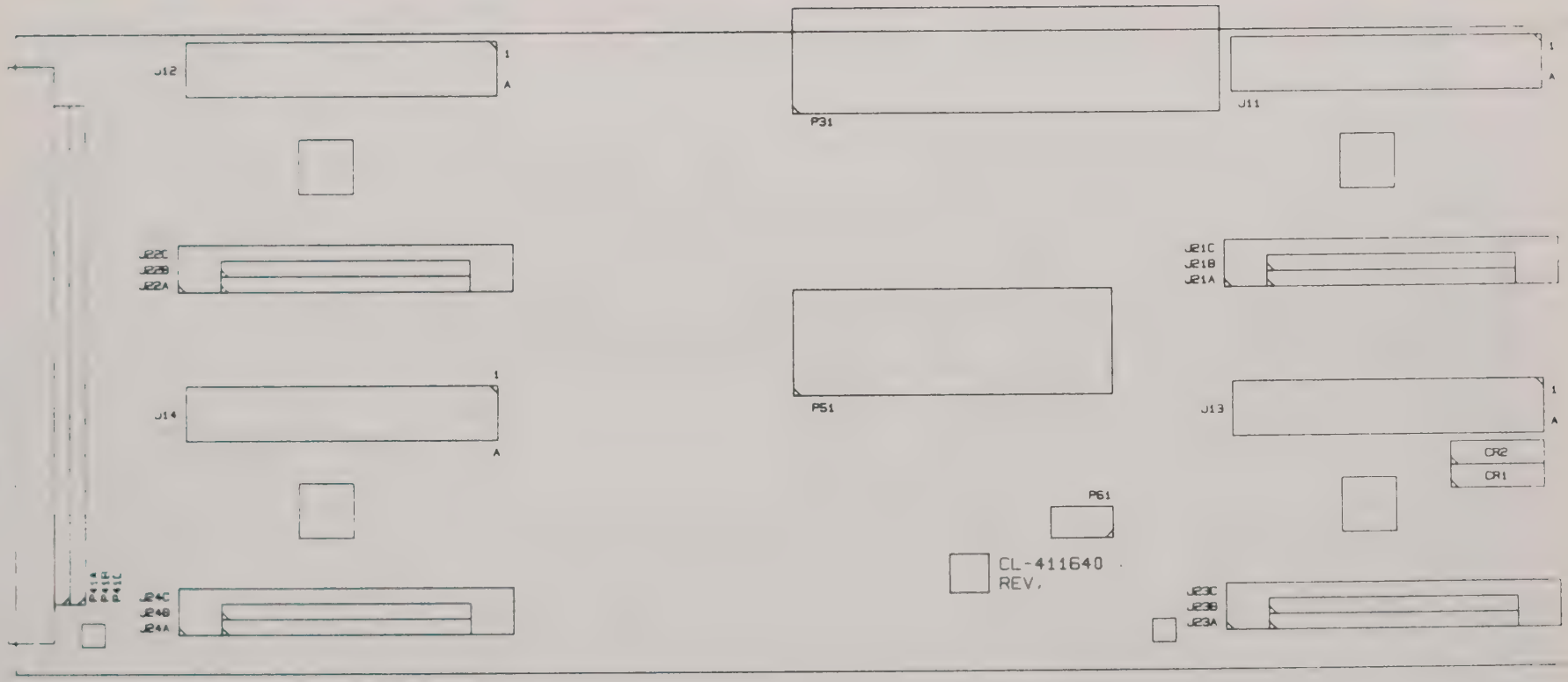


FIGURE 4-43 RS 3400 MOTHER BD. SIGNAL CONDITIONER CAGE

RS 3400 & RS 3200 THERMAL RECORDER
MOBILE CART
FIGURE 4-44

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
1	11-6405-05	Cart Assy., Mobile	
2	CL-211649	Strap, Buckled	
3	244905	Caster, Swivel	

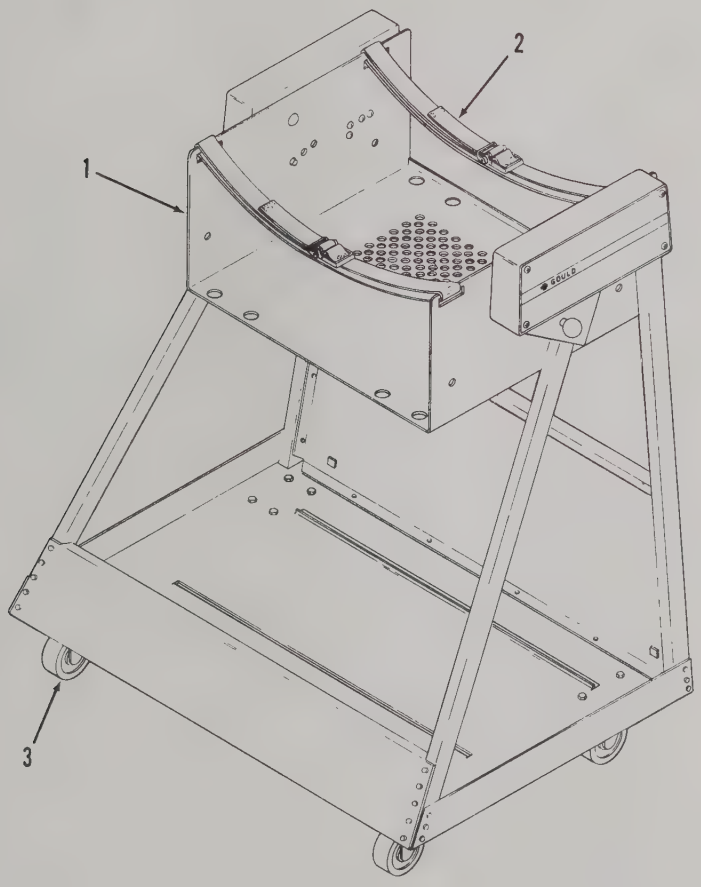


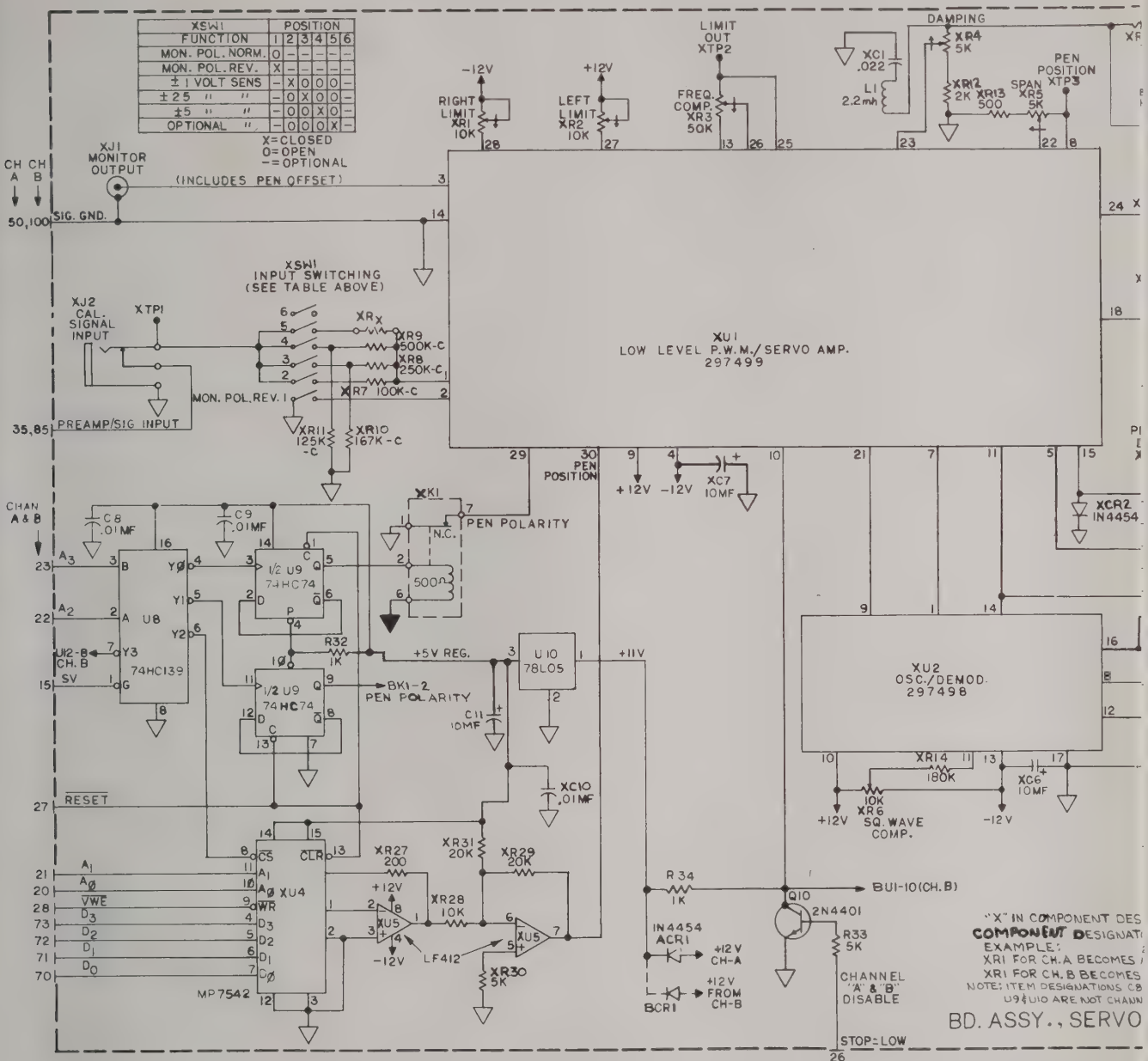
FIGURE 4-44 MOBILE CART

APPENDIX A

SCHEMATIC DIAGRAMS

Listed below are the schematic diagrams which apply to RS 3200 and RS 3400 thermal recorders. The schematics follow this page in the order which they are listed. The PC board assembly number and the corresponding schematic number have the same basic number in common. The assembly number begins with a 8 and the schematic number with a 2.

Schematic Number	Rev Level	Description
297406	K	Servo Drive Bd.
297515	J	5 volt Power Supply Bd.
297635	E	Chart Supply Sensor Bd.
297636	E	IRIG Interface Bd.
297637	S	Controller Bd.
297650	J	RS 3200 Mother Bd.
297651	H	RS 3400 Mother Bd.
297658	F	Chart Drive Bd.
297727	H	IEEE-488 Interface Bd.
297728	H	RS-232 Interface Bd.
297809	L	Pen Heat Control Bd.
297811	H	RS 3200 Mother-In-Law Bd.
297812	J	RS 3400 Mother-In-Law Bd.
297843	F	RS 3200 Keyboard Bd.
297844	F	RS 3400 Keyboard Bb.
297912	A	Photo Sensor Cable Assy.
CL-210191	E	Interchannel Annotation Driver Bd.
CL-210240	G	Paper Out Sensor Bd.
CL-210290	-	Speed Monitor Bd.
CL-210438	D	RS 3400 Interconnect Bd.
CL-210439	B	RS 3400 Medical Output Bd.
CL-210461	D	RS 3200 Interconnect Bd.
CL-210462	B	RS 3200 Medical Output Bd.
CL-210466	D	Voltage Selector Bd.
CL-210541	E	Interpreter Bd.
CL-211348	B	Pen Lead Retainer Bd. (30-V8420-1X only)
CL-211532	A	Overall Schematic Model Numer 30-V8412-1X
CL-211534	A	Overall Schematic Model Numer 30-V8420-1X
CL-211536	A	Overall Schematic Model Numer 30-V8404-1X
CL-211538	A	Overall Schematic Model Numer 30-V8210-1X
CL-211540	A	Overall Schematic Model Numer 30-V8202-1X
CL-211619	B	RS 3200 Mother Bd. Signal Conditioner Cage
CL-211640	B	RS 3400 Mother Bd. Signal Conditioner Cage
384919	J	Power Kit
393130	H	Power Kit



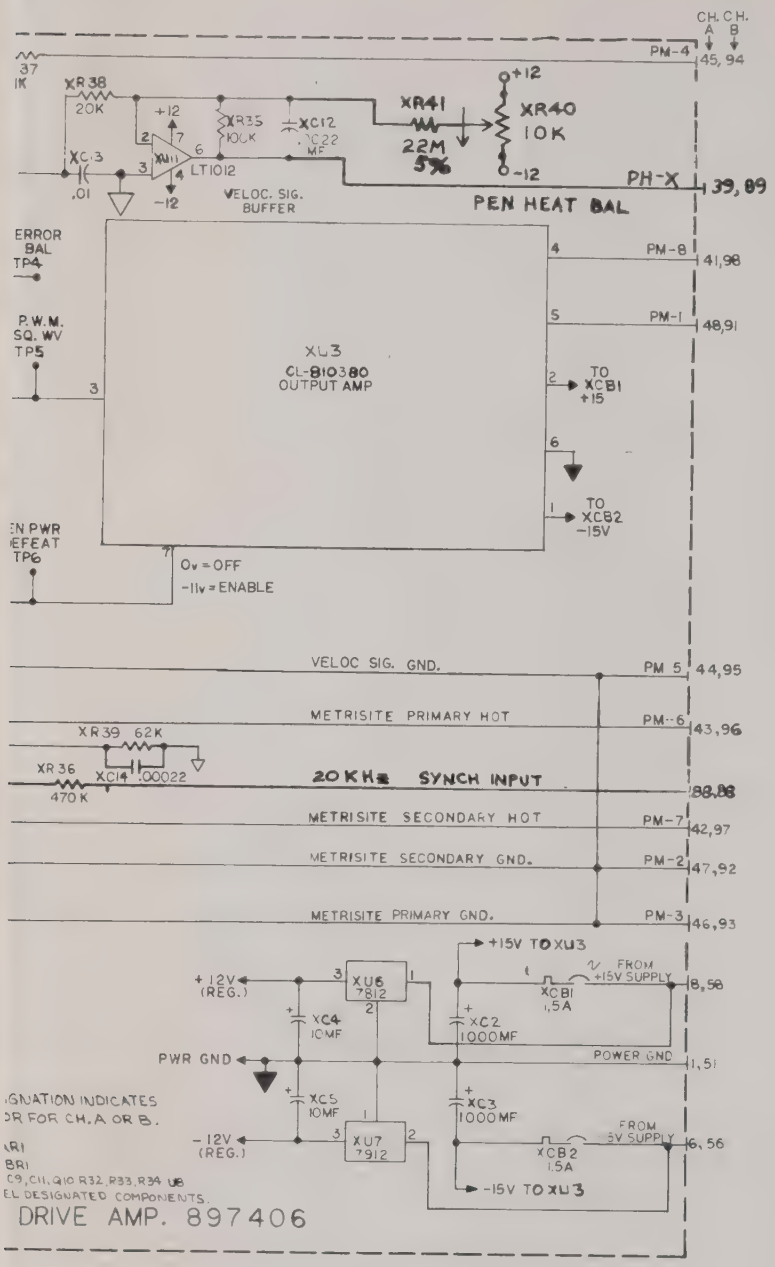
3. CONNECTIONS PM-1 THRU PM-8 REFER TO PEN MOTOR TERMINALS 1 THRU 8.

2. UNLESS OTHERWISE INDICATED:
ALL CAPACITANCE IN MICROFRADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS 1/4W, 1%
TOLERANCE C=.25%

1. SIG. GND. ▽ IS TIED TO PWR GND ▼ VIA BACKPLANE CONNECTOR PINS 1,50,51 & 100
NOTES:

I.C.	+5
297499	
297498	
CL-810380	
MP7542	14
LF412	
74HC139	16
74HC74	14
LT1012	
7812	
7912	

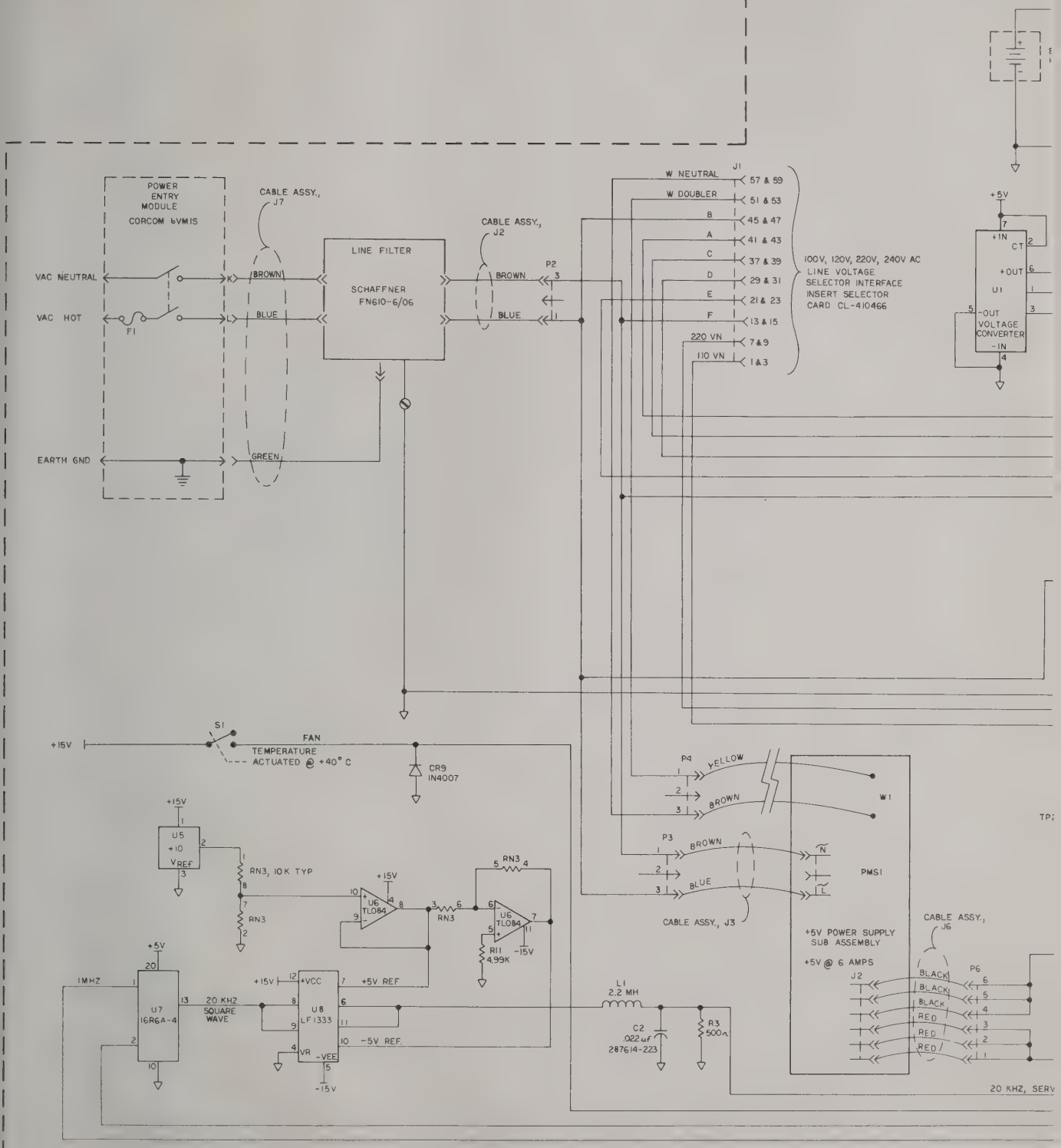
REVISIONS		
SYM	DESCRIPTION	DATE
K	NOT AFFECTED DCN 34002 CLARK	3-27-87



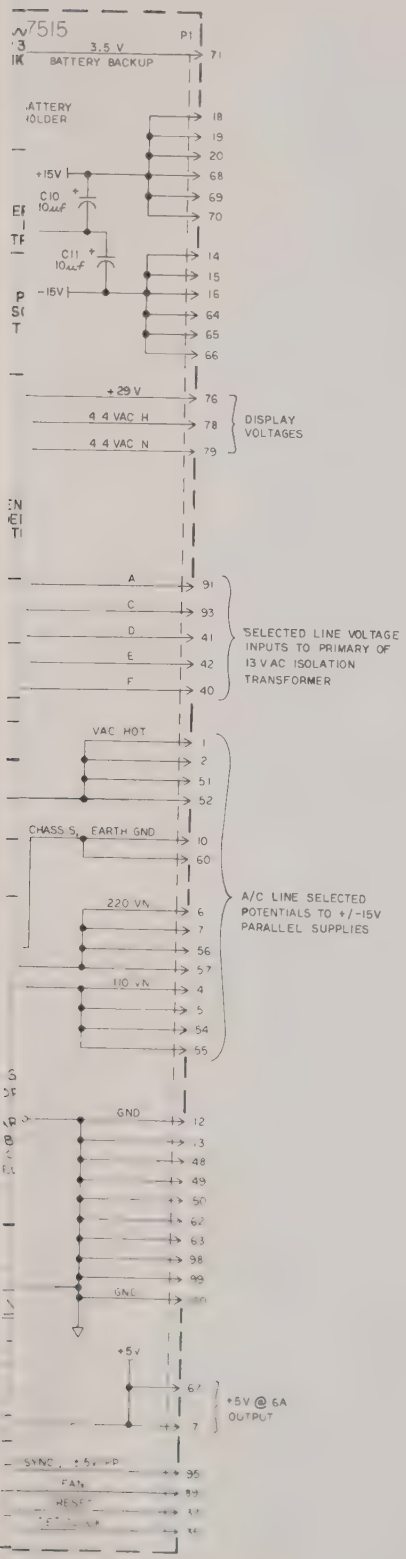
POWER / GROUND PIN CHART						
V	GND.	+15V	-5V	+12V	-2V	SYMBOL
	14, 5			9	4	XU1
	14, 12			10	13	XU2
	6	2	1			XU3
	12					XU4
				9	4	XU5
	8					U8
	7					U9
				7	4	XU11
	2	1				U6
	1		2			U7

BOARD ASSY. SERVO DRIVE AMP. 897406

BY	DATE	NAME	Gould Inc Instruments Division Cleveland, Ohio 44117 U.S.A.
BREMENDOER	10/86	SCHEMATIC	
Swartz	11/86	CODE IDENT 96795	DWG NO 297406
[illegible]	11/86	ISSUE CODE G	


POWER ENTRY MODULE CORCOM 6VM1S
CABLE ASSY., J7
LINE FILTER SCHAFFNER FN610-6/06
CABLE ASSY., J2
VAC NEUTRAL
VAC HOT
F1
EARTH GND
BROWN
BLUE
GREEN
P2
J1
W NEUTRAL 57 & 59
W DOUBLER 51 & 53
B 45 & 47
A 41 & 43
C 37 & 39
D 29 & 31
E 21 & 23
F 13 & 15
220 VN 7&9
110 VN 1&3
100V, 120V, 220V, 240V AC LINE VOLTAGE SELECTOR INTERFACE INSERT SELECTOR CARD CL-410466
+5V
+IN
CT
+OUT
U1
-OUT
-IN
VOLTAGE CONVERTER
+15V
S1
FAN
TEMPERATURE ACTUATED @ +40° C
CR9 IN4007
U5 +10 VREF
RN3, 10K TYP
RN3
U6 TL084
R11 4.99K
-15V
1MHZ
U7 1686A-4
20 KHZ SQUARE WAVE
U8 LF1333
+VCC
+5V REF
-5V REF.
VR
-VEE
L1 2.2 MH
C2 .022 uf 287614-223
R3 500Ω
P4
YELLOW
BROWN
W1
P3
BROWN
BLUE
CABLE ASSY., J3
PMS1
+5V POWER SUPPLY SUB ASSEMBLY
+5V @ 6 AMPS
J2
CABLE ASSY., J6
P6
BLACK
BLACK
BLACK
RED
RED
RED
20 KHZ, SERV

REVISIONS		
SYM	DESCRIPTION	DATE
J-1	NOT AFFECTED PER DCN 34267/A SOTEROS	6-9-87



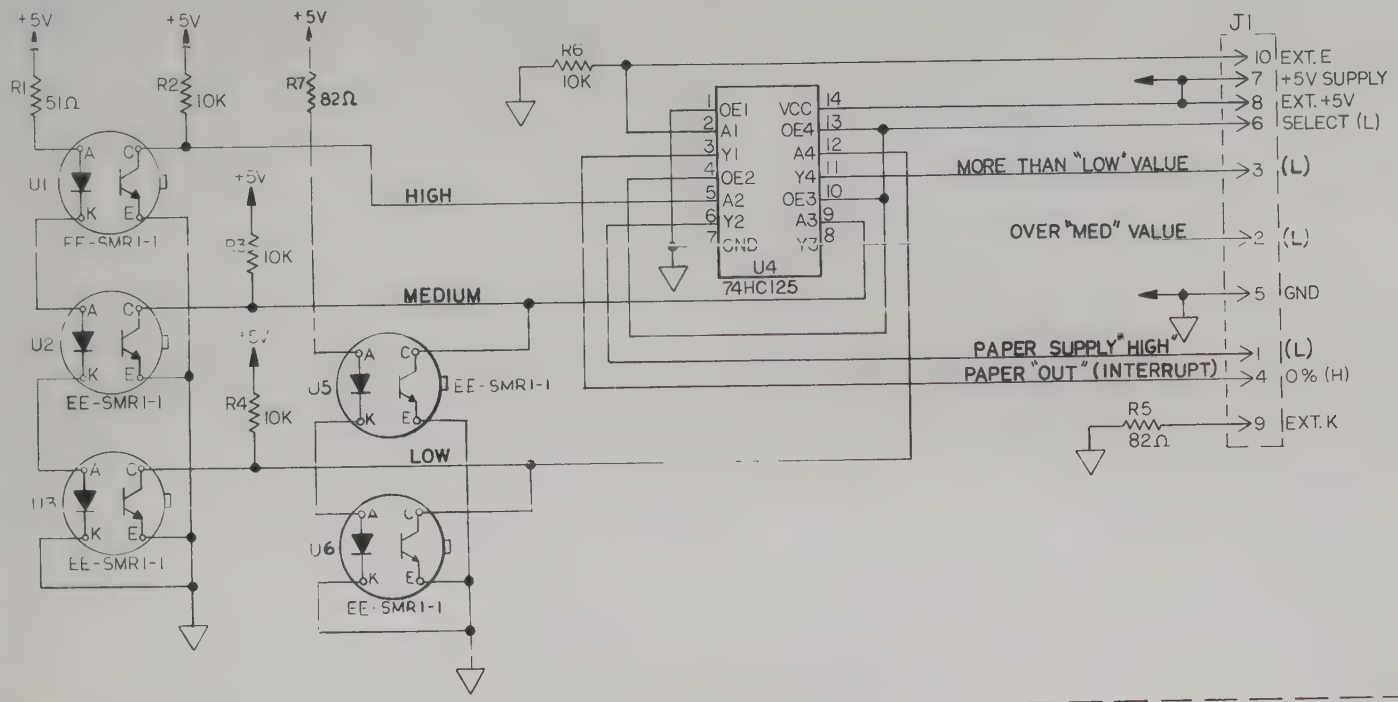
297515

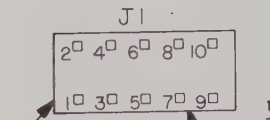
BOARD ASS'Y, 5V POWER SUPPLY 897515

BY	DATE	NAME	Gould Inc Instruments Division
BREMENOUR	11-66	SCHEMATIC	
		CODE IDENT 96795	DWG NO 297515
		ISSUE CODE G	

REVISIONS			
SYM	DESCRIPTION		DATE
D	ORIGINAL RELEASE DCN 33612 SWARTZ		11-12-86
E	REVISED PER DCN 33961	CLARK	3-12-87

CHART SUPPLY SENSOR BOARD 897635





2.) SENSOR SYMBOLS ARE LEAD END VIEWS

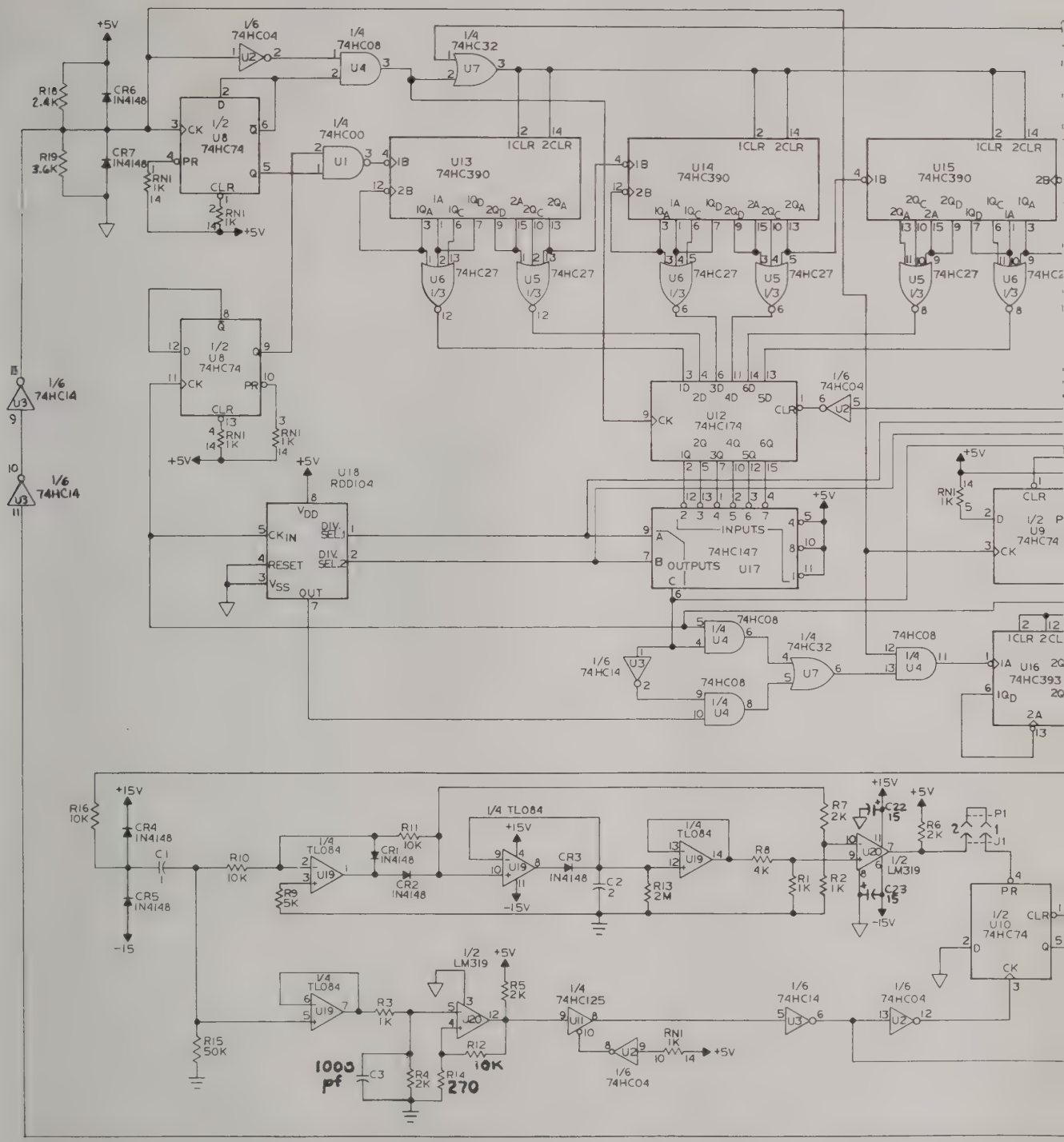
1.) (L) OR (H) = CONDITION "TRUE" FOR LOW (L) OR HIGH (H) TTL LEVEL AT INDICATED TERMINAL.

NOTES:

BOARD ASS'Y, CHART SUPPLY SENSOR 897635

BY	DATE	NAME	Gould Inc Instruments Division Cleveland Ohio 44114 U.S.A.
DR J. KOCHIS	9-86	SCHEMATIC	
CH	11-86		
APP T. ZAFF	11/86	CODE IDENT 96795	DWG. NO. 297635
		ISSUE CODE G	

87



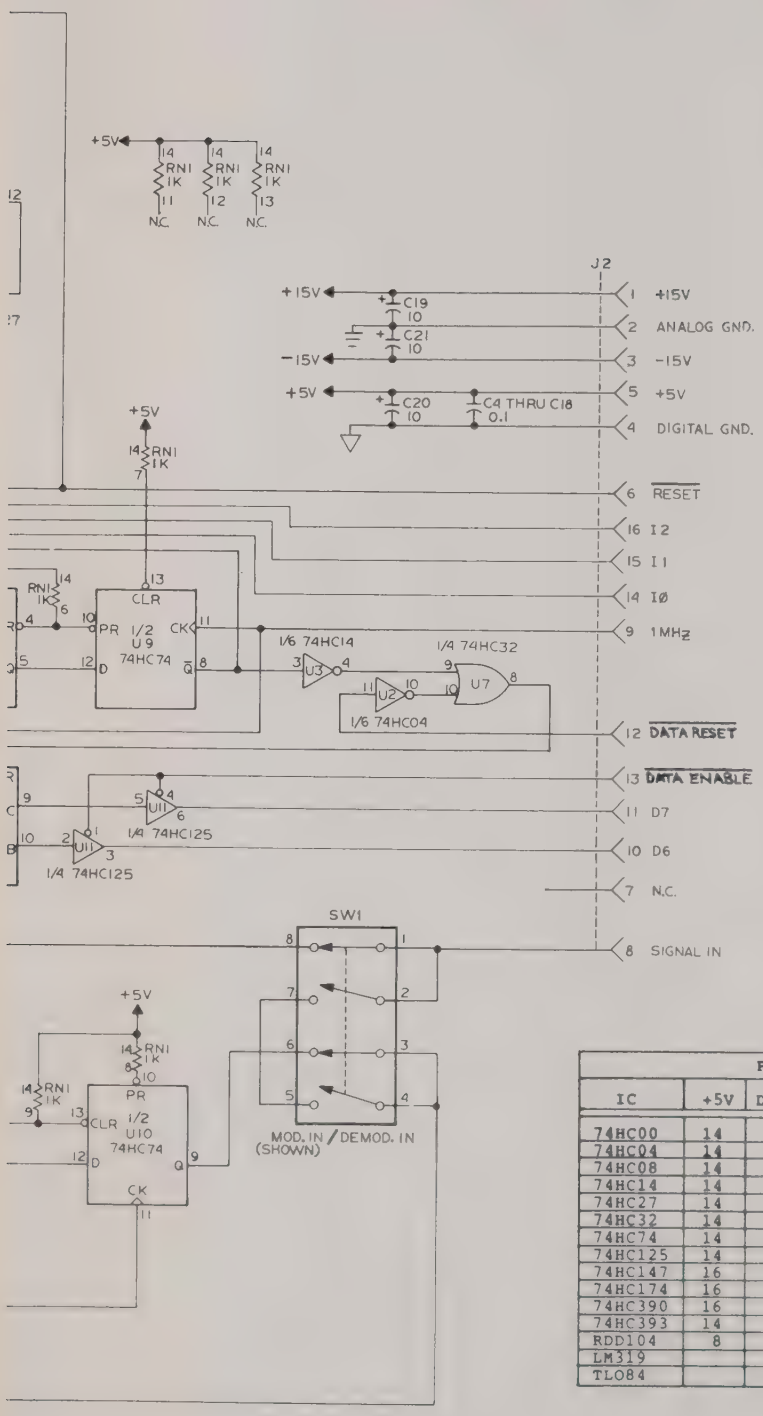
2. ⏚ = ANALOG GROUND

▽ = DIGITAL GROUND

1. UNLESS OTHERWISE INDICATED:
   ALL CAPACITANCE IN MICROFARADS
   ALL RESISTANCE IN OHMS
   ALL RESISTORS 1/4W, 1%

OTES:

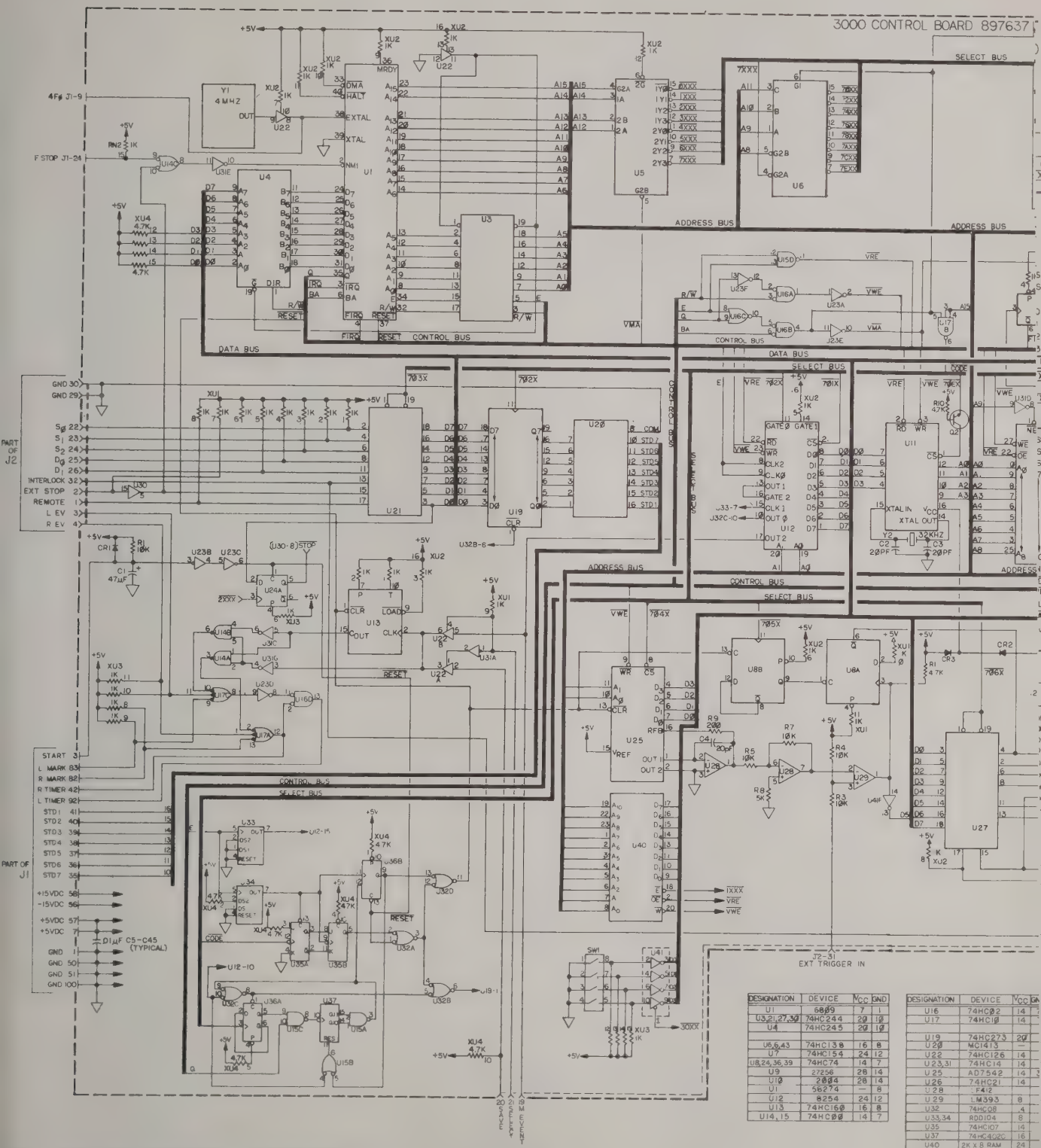
REVISIONS		
SYM	DESCRIPTION	DATE
E	NOT AFFECTED PER DCN 33201 SWARTZ	8-6-86



POWER/GROUND PIN CHART					
IC	+5V	DIGITAL GND	+15V	-15V	SYMBOL
74HC00	14	7			U1
74HC04	14	7			U2
74HC08	14	7			U4
74HC14	14	7			U3
74HC27	14	7			U5,6
74HC32	14	7			U7
74HC74	14	7			U8,9,10
74HC125	14	7			U11
74HC147	16	8			U17
74HC174	16	8			U12
74HC390	16	8			U13,14,15
74HC393	14	7			U16
RDD104	8	3			U18
LM319			11	6	U20
TL084			4	11	U19

BOARD ASSY., IRIG 897636

	NAME	
DR P. MILLER 11-18-85	SCHEMATIC	Gould Inc Instruments Division Cleveland Ohio 44114 U.S.A.
CZECH 6-7-86	CODE IDENT 96795	DWG NO 297636

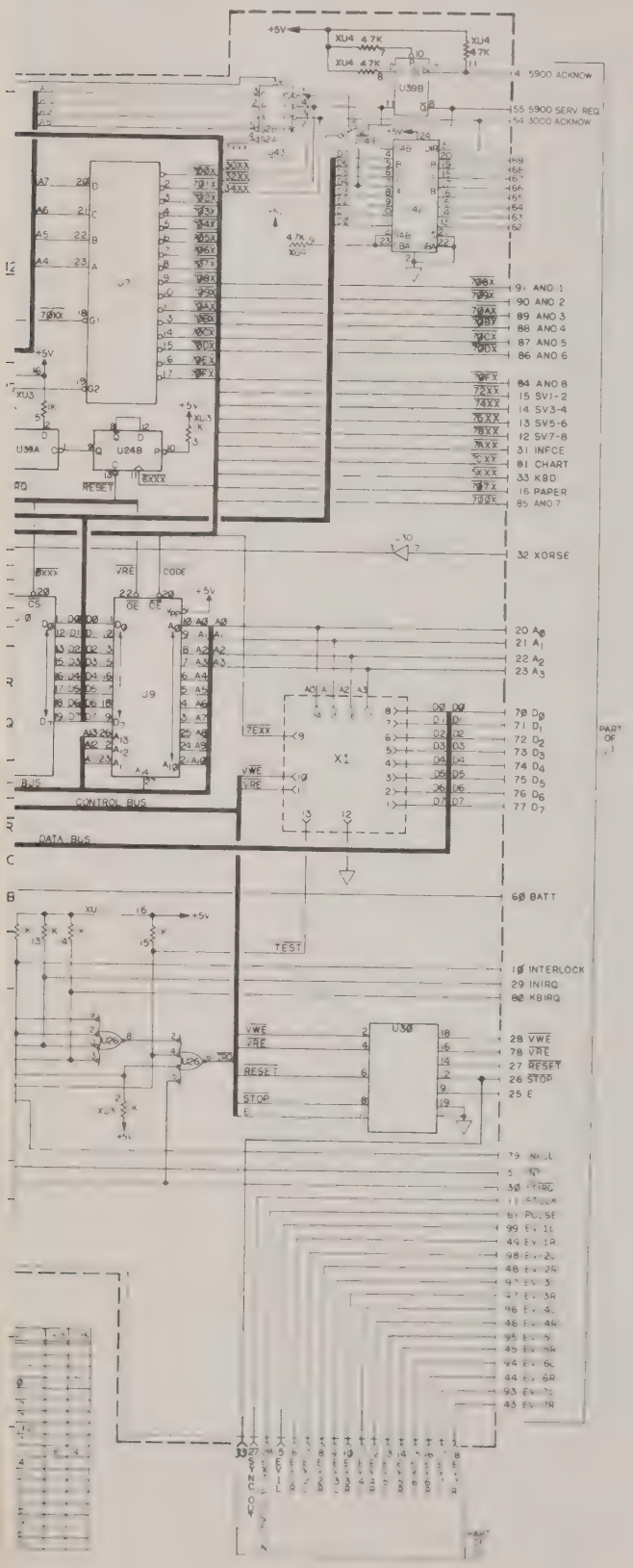


DESIGNATION	DEVICE	V_{CC}	GND
U1	6809	7	1
U3,21,27,30	74HC244	20	10
U4	74HC245	20	10
U6,6,43	74HC138	16	8
U7	74HC154	24	12
U8,24,36,39	74HC74	14	7
U9	27256	28	14
U10	2004	28	14
U1	56274	—	8
U12	8254	24	12
U13	74HC160	16	8
U14,15	74HC00	14	7

DESIGNATION	DEVICE	V_{CC}	GND
U16	74HC02	14	7
U17	74HC10	14	7
U19	74HC273	20	10
U20	MC1413	—	—
U22	74HC126	14	7
U23,31	74HC14	14	7
U25	AD7542	14	3
U26	74HC21	14	7
U28	LF42		
U29	LM393	8	
U32	74HC08	4	7
U33,34	RDD104	8	
U35	74HC107	14	7
U37	74HC4020	16	8
U40	2K X 8 RAM	24	12
U41	74HC368	16	8
U42	74HC646	24	12

NOTE: UNLESS OTHERWISE INDICATED.
ALL CAPACITANCE IN MICROFARADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS .25 WATT, 10%.

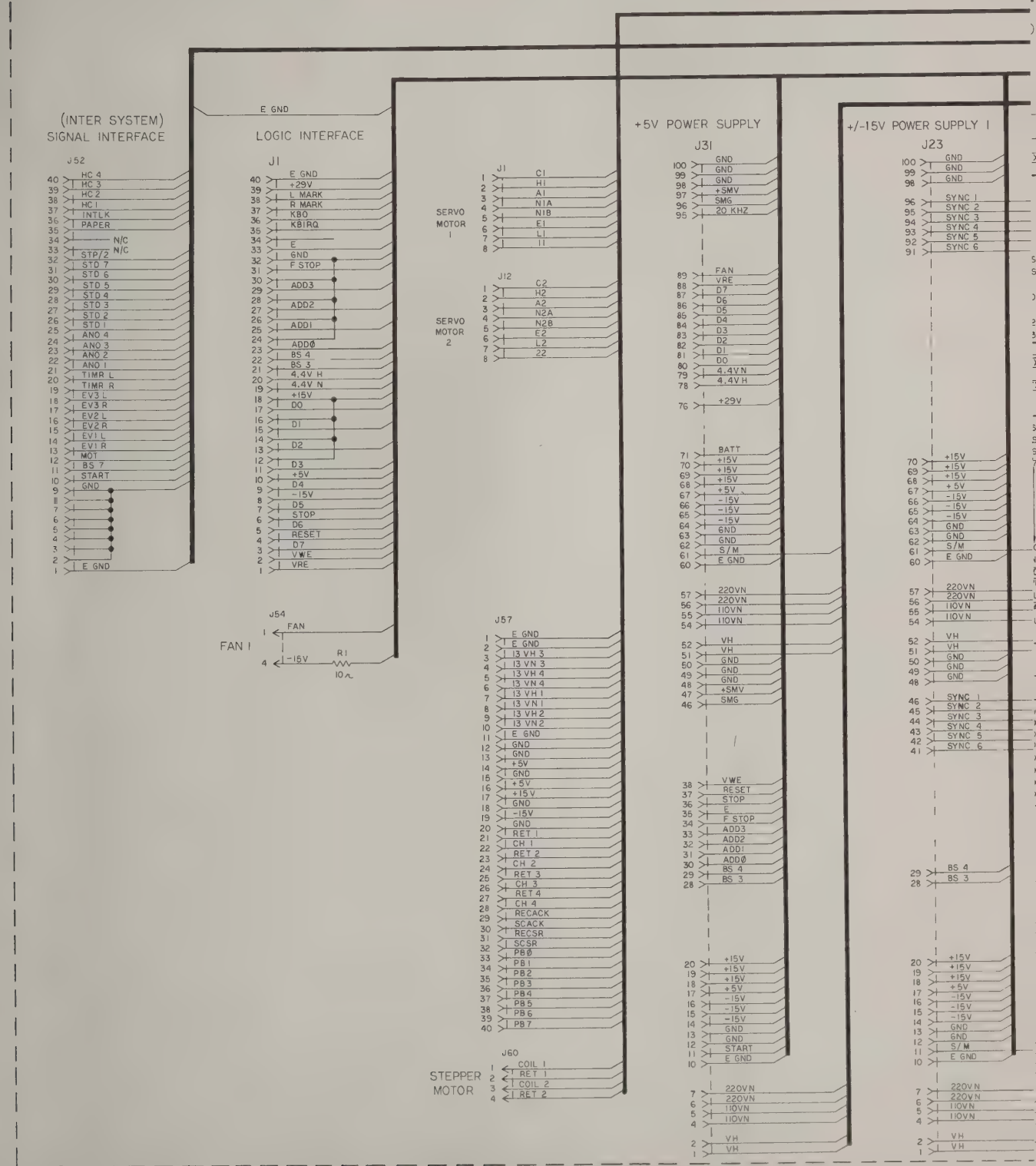
REVISIONS		
SYM	DESCRIPTION	DATE
S	NOT AFFECTED PER DCN 34378 RIVERA	7-29-87



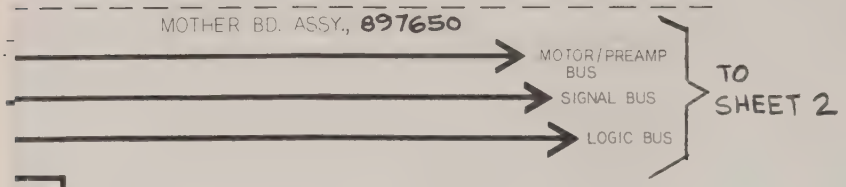
897637-1

BOARD ASSY., CONTROL 897637

DR J. KOCHIS 8-30-86	NAME SCHEMATIC	Gould Inc Instruments Division	
CHK SWARTZ 11/86	CODE IDENT. 96795	SIZE G	DWG NO 297637
APP KRAIZEL 12/86			


(INTER SYSTEM)
SIGNAL INTERFACE
J52
40 HC 4
39 HC 3
38 HC 2
37 HC 1
36 INTLK
35 PAPER
34 N/C
33 N/C
32 STP/2
31 STD 7
30 STD 6
29 STD 5
28 STD 4
27 STD 3
26 STD 2
25 STD 1
24 ANO 4
23 ANO 3
22 ANO 2
21 ANO 1
20 TIMR L
19 TIMR R
18 EV3 L
17 EV3 R
16 EV2 L
15 EV2 R
14 EV1 L
13 EV1 R
12 MOT
11 BS 7
10 START
9 GND
2 E GND
1 E GND
LOGIC INTERFACE
J1
40 E GND
39 +29V
38 L MARK
37 R MARK
36 KBO
35 KBIRQ
34 E
33 GND
32 F STOP
31 ADD3
30 ADD2
29 ADD1
28 ADDØ
27 BS 4
26 BS 3
25 4.4V H
24 4.4V N
23 +15V
22 DO
21 D1
20 D2
19 D3
18 +5V
17 D4
16 -15V
15 D5
14 STOP
13 D6
12 RESET
11 D7
10 VWE
9 VRE
J54
1 FAN
4 -15V
FAN 1
R1
10Ω
SERVO MOTOR 1
J11
1 C1
2 H1
3 A1
4 N1A
5 N1B
6 E1
7 L1
8 11
SERVO MOTOR 2
J12
1 C2
2 H2
3 A2
4 N2A
5 N2B
6 E2
7 L2
8 22
J57
1 E GND
2 E GND
3 13 VH 3
4 13 VN 3
5 13 VH 4
6 13 VN 4
7 13 VH 1
8 13 VN 1
9 13 VH 2
10 13 VN 2
11 E GND
12 GND
13 GND
14 +5V
15 GND
16 +5V
17 +15V
18 GND
19 -15V
20 GND
21 RET 1
22 CH 1
23 RET 2
24 CH 2
25 RET 3
26 CH 3
27 RET 4
28 CH 4
29 RECACK
30 SCACK
31 RECSR
32 SCSR
33 PBØ
34 PB1
35 PB2
36 PB3
37 PB4
38 PB5
39 PB6
40 PB7
J60
STEPPER MOTOR
1 COIL 1
2 RET 1
3 COIL 2
4 RET 2
+5V POWER SUPPLY
J31
100 GND
99 GND
98 GND
97 +SMV
96 SMG
95 20 KHZ
89 FAN
88 VRE
87 D7
86 D6
85 D5
84 D4
83 D3
82 D2
81 D1
80 DO
79 4.4VN
78 4.4VH
76 +29V
71 BATT
70 +15V
69 +15V
68 +15V
67 +5V
66 -15V
65 -15V
64 -15V
63 GND
62 GND
61 S/M
60 E GND
57 220VN
56 220VN
55 110VN
54 110VN
52 VH
51 VH
50 GND
49 GND
48 GND
47 +SMV
46 SMG
38 VWE
37 RESET
36 STOP
35 E
34 F STOP
33 ADD3
32 ADD2
31 ADD1
30 ADDØ
29 BS 4
28 BS 3
20 +15V
19 +15V
18 +15V
17 +5V
16 -15V
15 -15V
14 -15V
13 GND
12 GND
11 START
10 E GND
7 220VN
6 220VN
5 110VN
4 110VN
2 VH
1 VH
+/-15V POWER SUPPLY I
J23
100 GND
99 GND
98 GND
96 SYNC 1
95 SYNC 2
94 SYNC 3
93 SYNC 4
92 SYNC 5
91 SYNC 6
70 +15V
69 +15V
68 +15V
67 +5V
66 -15V
65 -15V
64 -15V
63 GND
62 GND
61 S/M
60 E GND
57 220VN
56 220VN
55 110VN
54 110VN
52 VH
51 VH
50 GND
49 GND
48 GND
46 SYNC 1
45 SYNC 2
44 SYNC 3
43 SYNC 4
42 SYNC 5
41 SYNC 6
29 BS 4
28 BS 3
20 +15V
19 +15V
18 +15V
17 +5V
16 -15V
15 -15V
14 -15V
13 GND
12 GND
11 S/M
10 E GND
7 220VN
6 220VN
5 110VN
4 110VN
2 VH
1 VH

REVISIONS		
SYM	DESCRIPTION	DATE
H	ORIGINAL RELEASE LEVEL DCN 33745	12-19-86 RIVERA
J	NOT AFFECTED PER DCN 33781 CLARK	1-27-87



BOARD ASS'Y, MOTHER 897650 2 CH.

BY	DATE
BREMENOUR	12-19-86

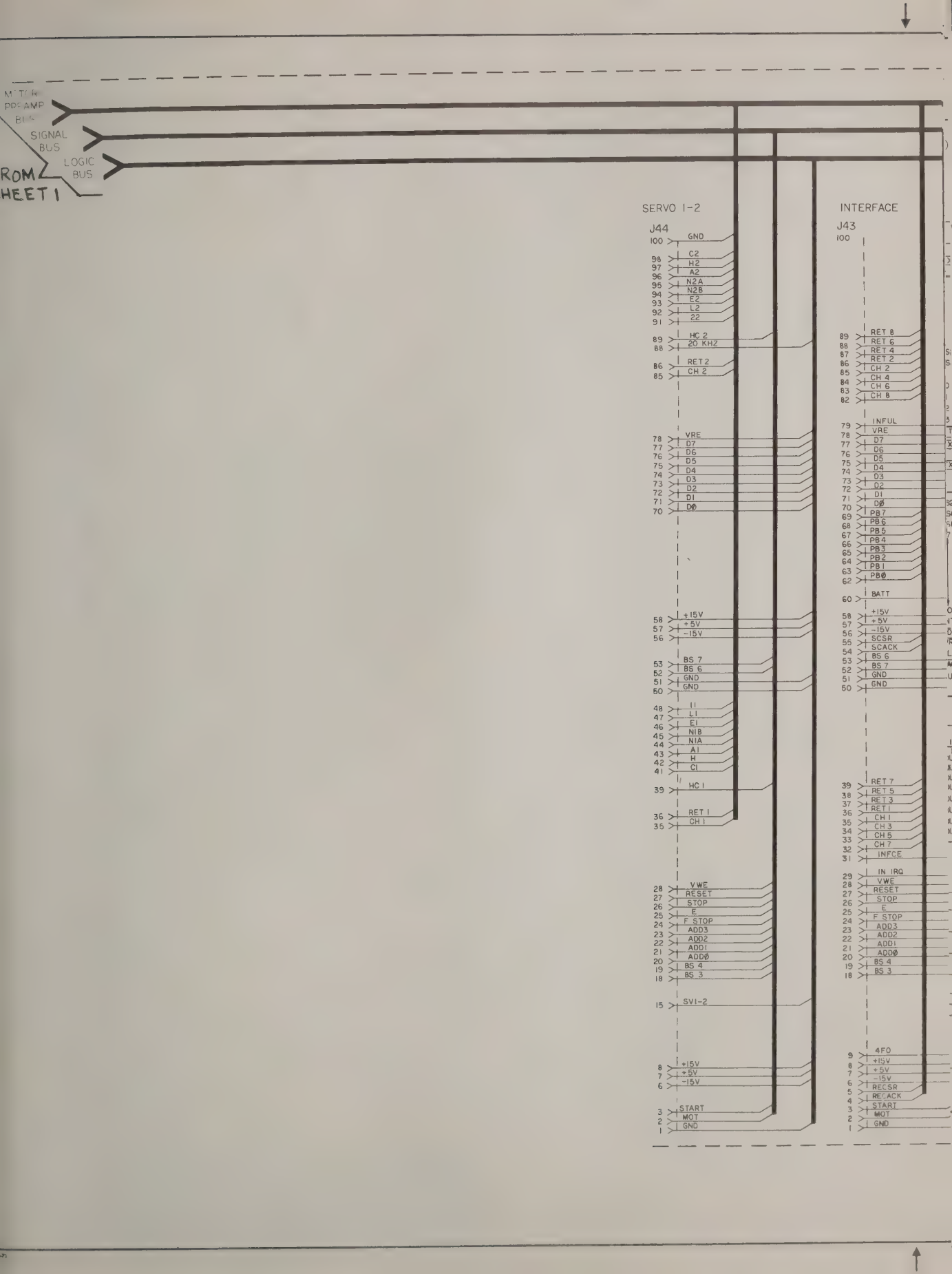
NAME: SCHEMATIC

Gould Inc. Instruments Division

CODE IDENT: 96795 ISSUE: G

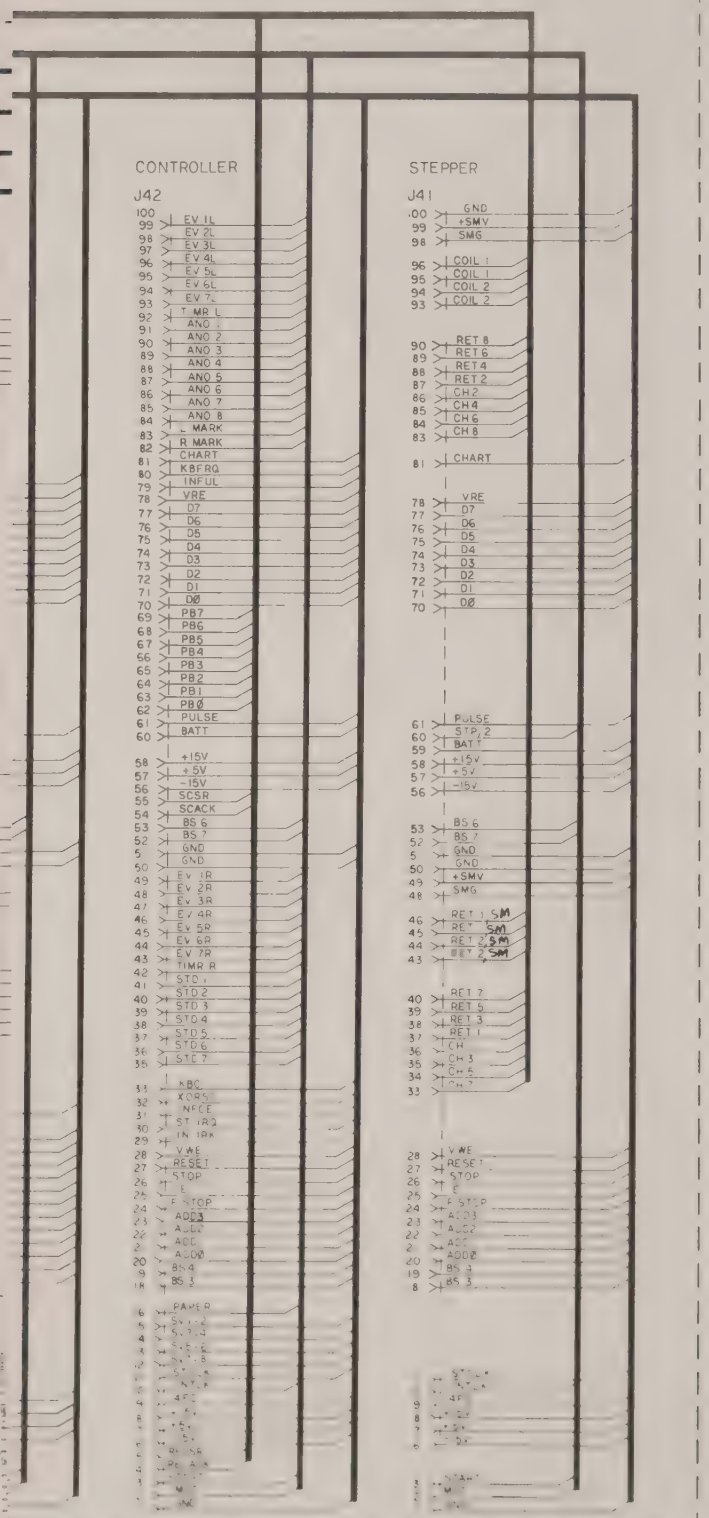
DWG NO: 297650

SHEET 1 OF 2


MOTOR PREAMP BUS
SIGNAL BUS
LOGIC BUS
ROM SHEET 1
SERVO 1-2
J44
100 GND
98 C2
97 H2
96 A2
95 N2A
94 N2B
93 E2
92 L2
91 22
89 HC 2
88 20 KHZ
86 RET 2
85 CH 2
78 VRE
77 D7
76 D6
75 D5
74 D4
73 D3
72 D2
71 D1
70 DØ
58 +15V
57 +5V
56 -15V
53 BS 7
52 BS 6
51 GND
50 GND
48 I1
47 L1
46 E1
45 N1B
44 N1A
43 A1
42 H
41 C1
39 HC 1
36 RET 1
35 CH 1
28 VWE
27 RESET
26 STOP
25 E
24 F STOP
23 ADD3
22 ADD2
21 ADD1
20 ADDØ
19 BS 4
18 BS 3
15 SV1-2
8 +15V
7 +5V
6 -15V
3 START
2 MOT
1 GND
INTERFACE
J43
100
89 RET 8
88 RET 6
87 RET 4
86 RET 2
85 CH 2
84 CH 4
83 CH 6
82 CH 8
79 INFUL
78 VRE
77 D7
76 D6
75 D5
74 D4
73 D3
72 D2
71 D1
70 DØ
69 PB7
68 PB6
67 PB5
66 PB4
65 PB3
64 PB2
63 PB1
62 PBØ
60 BATT
58 +15V
57 +5V
56 -15V
55 SCSR
54 SCACK
53 BS 6
52 BS 7
51 GND
50 GND
39 RET 7
38 RET 5
37 RET 3
36 RET 1
35 CH 1
34 CH 3
33 CH 5
32 CH 7
31 INFCE
29 IN IRQ
28 VWE
27 RESET
26 STOP
25 E
24 F STOP
23 ADD3
22 ADD2
21 ADD1
20 ADDØ
19 BS 4
18 BS 3
9 4FO
8 +15V
7 +5V
6 -15V
5 RECSR
4 RECACK
3 START
2 MOT
1 GND

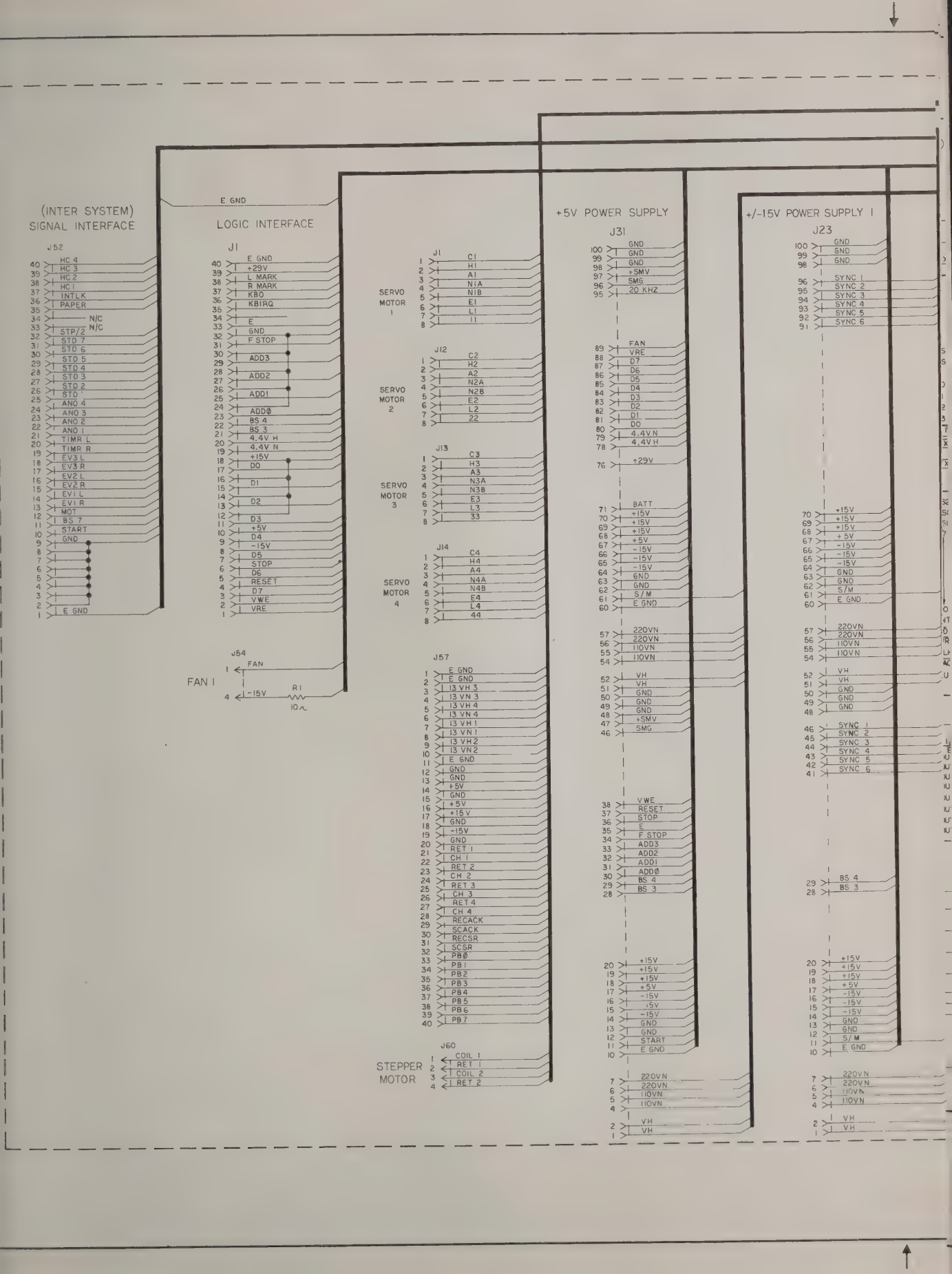
REVISIONS		
SYM	DESCRIPTION	DATE

MOTHER BD. ASSY., 897650



BOARD ASS'Y, MOTHER 897650 2 CH.

	DATE	NAME	Gould Inc Instruments Division Cleveland, Ohio 44114 U.S.A.
BREMENOOR	12-19-86	SCHEMATIC	
	1-10-87	CODE IDENT. 96795	DWG. NO. 297650
		ISSUE G	SHEET 2 OF 2


(INTER SYSTEM)
SIGNAL INTERFACE
J52
40 HC 4
39 HC 3
38 HC 2
37 HC 1
36 INTLK
35 PAPER
34 N/C
33 N/C
32 STP/2
31 STD 7
30 STD 6
29 STD 5
28 STD 4
27 STD 3
26 STD 2
25 STD 1
24 ANO 4
23 ANO 3
22 ANO 2
21 ANO 1
20 TIMR L
19 TIMR R
18 EV3 L
17 EV3 R
16 EV2 L
15 EV2 R
14 EV1 L
13 EV1 R
12 MOT
11 BS 7
10 START
9 GND
8
7
6
5
4
3
2
1 E GND
E GND
LOGIC INTERFACE
J1
40 E GND
39 +29V
38 L MARK
37 R MARK
36 KBD
35 KBIRQ
34
33 E
32 GND
31 F STOP
30
29 ADD3
28
27 ADD2
26
25 ADD1
24
23 ADDØ
22 BS 4
21 BS 3
20 4.4V H
19 4.4V N
18 +15V
17 DO
16
15 D1
14
13 D2
12
11 D3
10 +5V
9 D4
8 -15V
7 D5
6 STOP
5 D6
4 RESET
3 D7
2 VWE
1 VRE
J54
FAN 1
1 FAN
4 -15V
R1
10Ω
SERVO MOTOR 1
J1
1 C1
2 H1
3 A1
4 N1A
5 N1B
6 E1
7 L1
8 11
SERVO MOTOR 2
J12
1 C2
2 H2
3 A2
4 N2A
5 N2B
6 E2
7 L2
8 22
SERVO MOTOR 3
J13
1 C3
2 H3
3 A3
4 N3A
5 N3B
6 E3
7 L3
8 33
SERVO MOTOR 4
J14
1 C4
2 H4
3 A4
4 N4A
5 N4B
6 E4
7 L4
8 44
J57
1 E GND
2 E GND
3 I3 VH 3
4 I3 VN 3
5 I3 VH 4
6 I3 VN 4
7 I3 VH 1
8 I3 VN 1
9 I3 VH 2
10 I3 VN 2
11 E GND
12 GND
13 GND
14 +5V
15 GND
16 +5V
17 +15V
18 GND
19 -15V
20 GND
21 RET 1
22 CH 1
23 RET 2
24 CH 2
25 RET 3
26 CH 3
27 RET 4
28 CH 4
29 RECACK
30 SCACK
31 RECSR
32 SCSR
33 PBØ
34 PB1
35 PB2
36 PB3
37 PB4
38 PB5
39 PB6
40 PB7
J60
STEPPER MOTOR
1 COIL 1
2 RET 1
3 COIL 2
4 RET 2
+5V POWER SUPPLY
J31
100 GND
99 GND
98 GND
97 +SMV
96 SMG
95 20 KHZ
89 FAN
88 VRE
87 D7
86 D6
85 D5
84 D4
83 D3
82 D2
81 D1
80 DO
79 4.4V N
78 4.4V H
76 +29V
71 BATT
70 +15V
69 +15V
68 +15V
67 +5V
66 -15V
65 -15V
64 -15V
63 GND
62 GND
61 S/M
60 E GND
57 220VN
56 220VN
55 110VN
54 110VN
52 VH
51 VH
50 GND
49 GND
48 GND
47 +SMV
46 SMG
38 VWE
37 RESET
36 STOP
35 E
34 F STOP
33 ADD3
32 ADD2
31 ADD1
30 ADDØ
29 BS 4
28 BS 3
20 +15V
19 +15V
18 +15V
17 +5V
16 -15V
15 -15V
14 -15V
13 GND
12 GND
11 START
10 E GND
7 220VN
6 220VN
5 110VN
4 110VN
2 VH
1 VH
+/-15V POWER SUPPLY 1
J23
100 GND
99 GND
98 GND
96 SYNC 1
95 SYNC 2
94 SYNC 3
93 SYNC 4
92 SYNC 5
91 SYNC 6
70 +15V
69 +15V
68 +15V
67 +5V
66 -15V
65 -15V
64 -15V
63 GND
62 GND
61 S/M
60 E GND
57 220VN
56 220VN
55 110VN
54 110VN
52 VH
51 VH
50 GND
49 GND
48 GND
46 SYNC 1
45 SYNC 2
44 SYNC 3
43 SYNC 4
42 SYNC 5
41 SYNC 6
29 BS 4
28 BS 3
20 +15V
19 +15V
18 +15V
17 +5V
16 -15V
15 -15V
14 -15V
13 GND
12 GND
11 S/M
10 E GND
7 220VN
6 220VN
5 110VN
4 110VN
2 VH
1 VH

REVISIONS		
SYM	DESCRIPTION	DATE
H	ORIGINAL RELEASE DCN 33717 SWARTZ	12-1 .86

MOTHER BD. ASSY., 897651

MOTOR/PREAMP BUS

SIGNAL BUS

LOGIC BUS

TO SHEET 2

+/-15V POWER SUPPLY 2

J22

100 GND
99 GND
98 GND
97 SYNC
96 SYNC 2
95 SYNC 3
94 SYNC 4
93 SYNC 5
92 SYNC 6
91

70 +15V
69 + 5V
68 +15V
67 + 5V
66 -15V
65 - 5V
64 -15V
63 GND
62 GND
61
60 E GND

57 220VN
56 220VN
55 10VN
54 10VN

52 VH
51 VH
50 GND
49 GND
48 GND

46 SYNC 1
45 SYNC 2
44 SYNC 3
43 SYNC 4
42 SYNC 5
41 SYNC 6

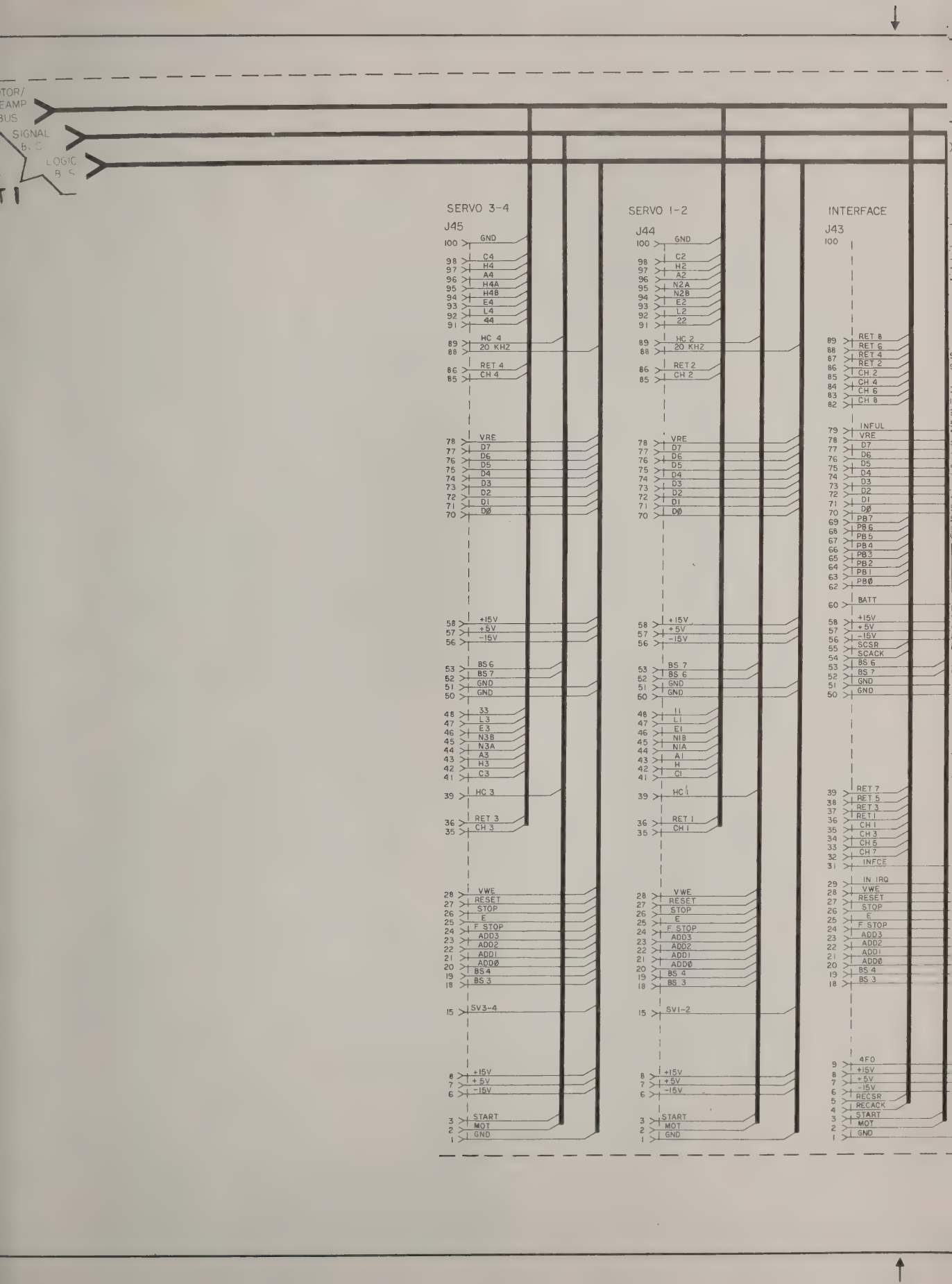
B- 4
B- 3

GND

BOARD ASS'Y., MOTHER 897651 4 CH.

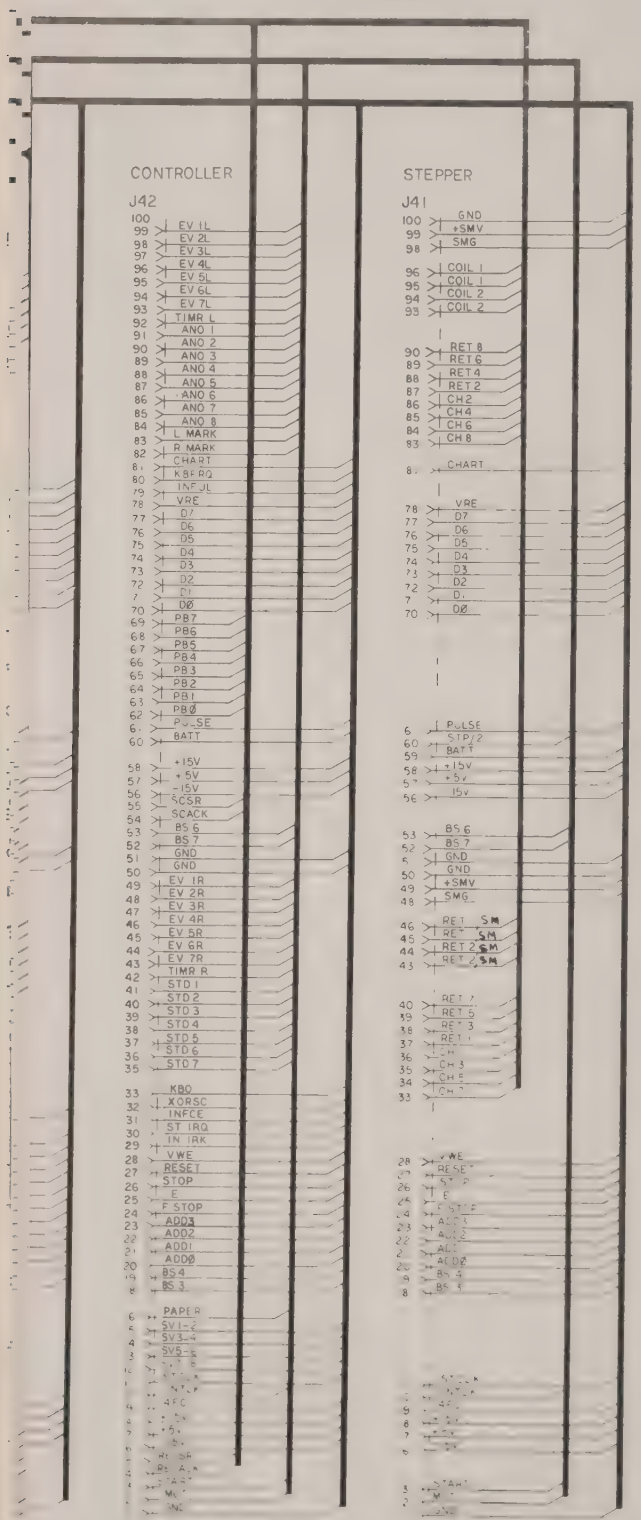
	DATE	NAME	Gould Inc. Instruments Division Cleveland Ohio 44114 U.S.A.
BREMENOUR	12-18-86	SCHEMATIC	
H. Swartz	12-18-86	CODE IDENT 96795	DWG NO. 297651
		ISSUE CODE G	SHEET 1 OF 2

297651 1


TOR/
EAMP
BUS
SIGNAL
LOGIC
SERVO 3-4
J45
100 GND
98 C4
97 H4
96 A4
95 H4A
94 H4B
93 E4
92 L4
91 44
89 HC 4
88 20 KHZ
86 RET 4
85 CH 4
78 VRE
77 D7
76 D6
75 D5
74 D4
73 D3
72 D2
71 D1
70 DØ
58 +15V
57 +5V
56 -15V
53 BS 6
52 BS 7
51 GND
50 GND
48 33
47 L3
46 E3
45 N3B
44 N3A
43 A3
42 H3
41 C3
39 HC 3
36 RET 3
35 CH 3
28 VWE
27 RESET
26 STOP
25 E
24 F STOP
23 ADD3
22 ADD2
21 ADD1
20 ADDØ
19 BS 4
18 BS 3
15 SV3-4
8 +15V
7 +5V
6 -15V
3 START
2 MOT
1 GND
SERVO 1-2
J44
100 GND
98 C2
97 H2
96 A2
95 N2A
94 N2B
93 E2
92 L2
91 22
89 HC 2
88 20 KHZ
86 RET 2
85 CH 2
78 VRE
77 D7
76 D6
75 D5
74 D4
73 D3
72 D2
71 D1
70 DØ
58 +15V
57 +5V
56 -15V
53 BS 7
52 BS 6
51 GND
50 GND
48 11
47 L1
46 E1
45 N1B
44 N1A
43 A1
42 H
41 C1
39 HC 1
36 RET 1
35 CH 1
28 VWE
27 RESET
26 STOP
25 E
24 F STOP
23 ADD3
22 ADD2
21 ADD1
20 ADDØ
19 BS 4
18 BS 3
15 SV1-2
8 +15V
7 +5V
6 -15V
3 START
2 MOT
1 GND
INTERFACE
J43
100
89 RET 8
88 RET 6
87 RET 4
86 RET 2
85 CH 2
84 CH 4
83 CH 6
82 CH 8
79 INFUL
78 VRE
77 D7
76 D6
75 D5
74 D4
73 D3
72 D2
71 D1
70 DØ
69 PB7
68 PB6
67 PB5
66 PB4
65 PB3
64 PB2
63 PB1
62 PBØ
60 BATT
58 +15V
57 +5V
56 -15V
55 SCSR
54 SCACK
53 BS 6
52 BS 7
51 GND
50 GND
39 RET 7
38 RET 5
37 RET 3
36 RET 1
35 CH 1
34 CH 3
33 CH 5
32 CH 7
31 INFCE
29 IN IRQ
28 VWE
27 RESET
26 STOP
25 E
24 F STOP
23 ADD3
22 ADD2
21 ADD1
20 ADDØ
19 BS 4
18 BS 3
9 4F0
8 +15V
7 +5V
6 -15V
5 RECSR
4 RECACK
3 START
2 MOT
1 GND

REVISIONS		
SYM	DESCRIPTION	DATE

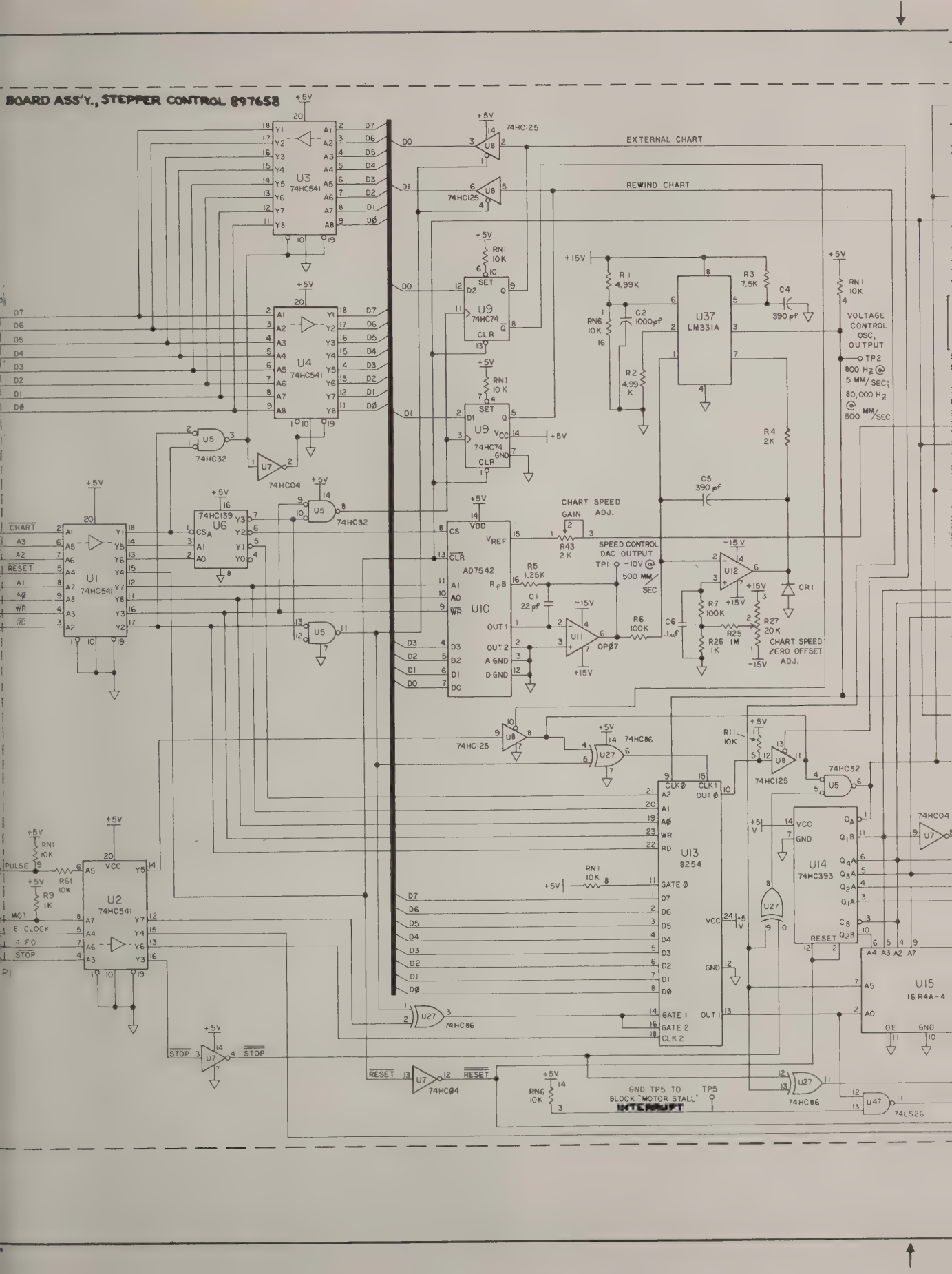
MOTHER BD. ASSY., 897651



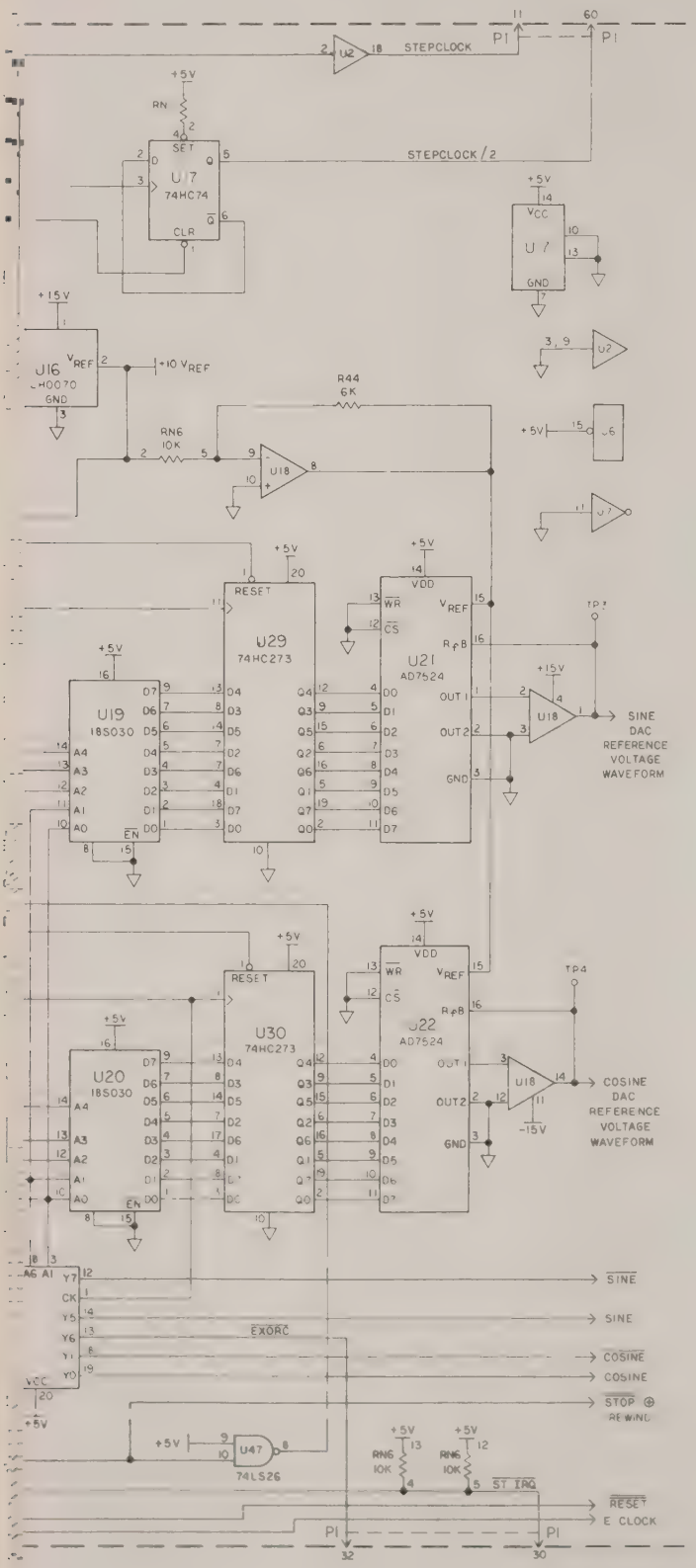
BOARD ASS'Y, MOTHER 897651 4CH.

BY	DATE	NAME	Gould Inc Instruments Division (Formerly Dow 441-4) U.S.A.
DRW BRENENDER	86	SCHEMATIC	DWG NO 297651
APP		CODE IDENT 96795	ISSUE CODE G
			SHEET 2 OF 2

297651 1


BOARD ASS'Y., STEPPER CONTROL 897658
EXTERNAL CHART
REWIND CHART
VOLTAGE CONTROL OSC, OUTPUT
TP2
800 Hz @ 5 MM/SEC; 80,000 Hz @ 500 MM/SEC
CHART SPEED GAIN ADJ.
SPEED CONTROL DAC OUTPUT
TP1 -10V @ 500 MM/SEC
CHART SPEED ZERO OFFSET ADJ.
GND TP5 TO BLOCK "MOTOR STALL" INTERRUPT
TP5
U1 74HC541
U2 74HC541
U3 74HC541
U4 74HC541
U5 74HC32
U6 74HC139
U7 74HC04
U8 74HC125
U9 74HC74
U10 AD7542
U11 OP07
U12
U13 8254
U14 74HC393
U15 16R4A-4
U27 74HC86
U37 LM331A
U47 74LS26
R1 4.99K
R2 4.99K
R3 7.5K
R4 2K
R5 1.25K
R6 100K
R7 100K
R9 1K
R11 10K
R25 1M
R26 1K
R27 20K
RN1 10K
RN6 10K
C1 22pf
C2 1000pf
C4 390pf
C5 390pf
C6 1uf
CR1
CHART
RESET
PULSE
MOT
E CLOCK
4 F.O
STOP
P1

REVISIONS		
SYM	DESCRIPTION	DATE
E-1	ORIGINAL REL. ISSUE LEVEL DCN 33660/A.SOTEROS	1-30-87
F-1	REVISED PER DCN 34313/A.SOTEROS	7-6-87



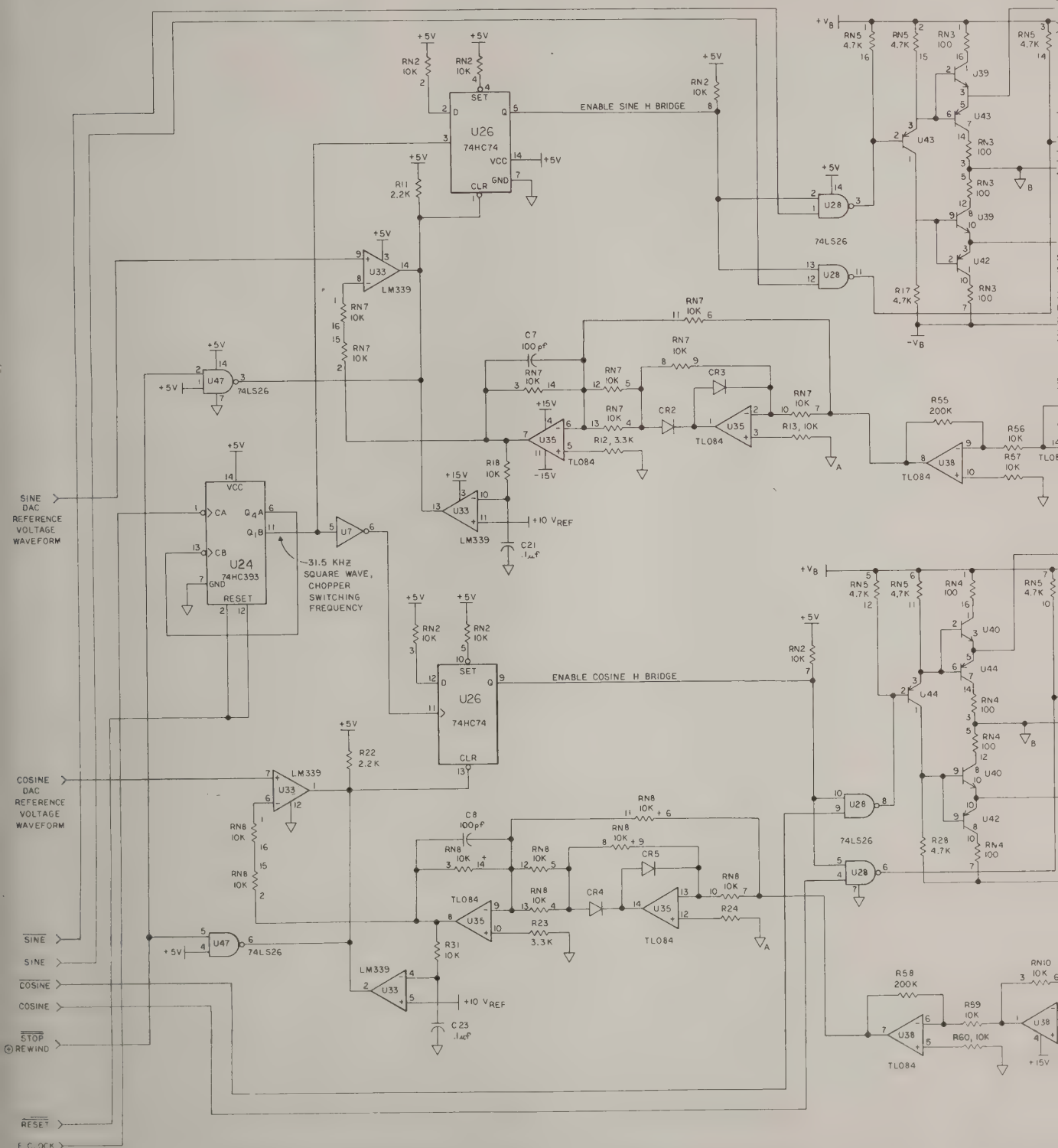
⚠S. THIS BOARD CONTAINS STATIC SENSITIVE COMPONENTS AND MUST BE HANDLED PER MEI-0011.

1. UNLESS OTHERWISE INDICATED, ALL CAPACITANCE IN MICROFARADS. ALL RESISTANCE IN OHMS. ALL RESISTORS ±1%, 1/4 WATT.

NOTES:

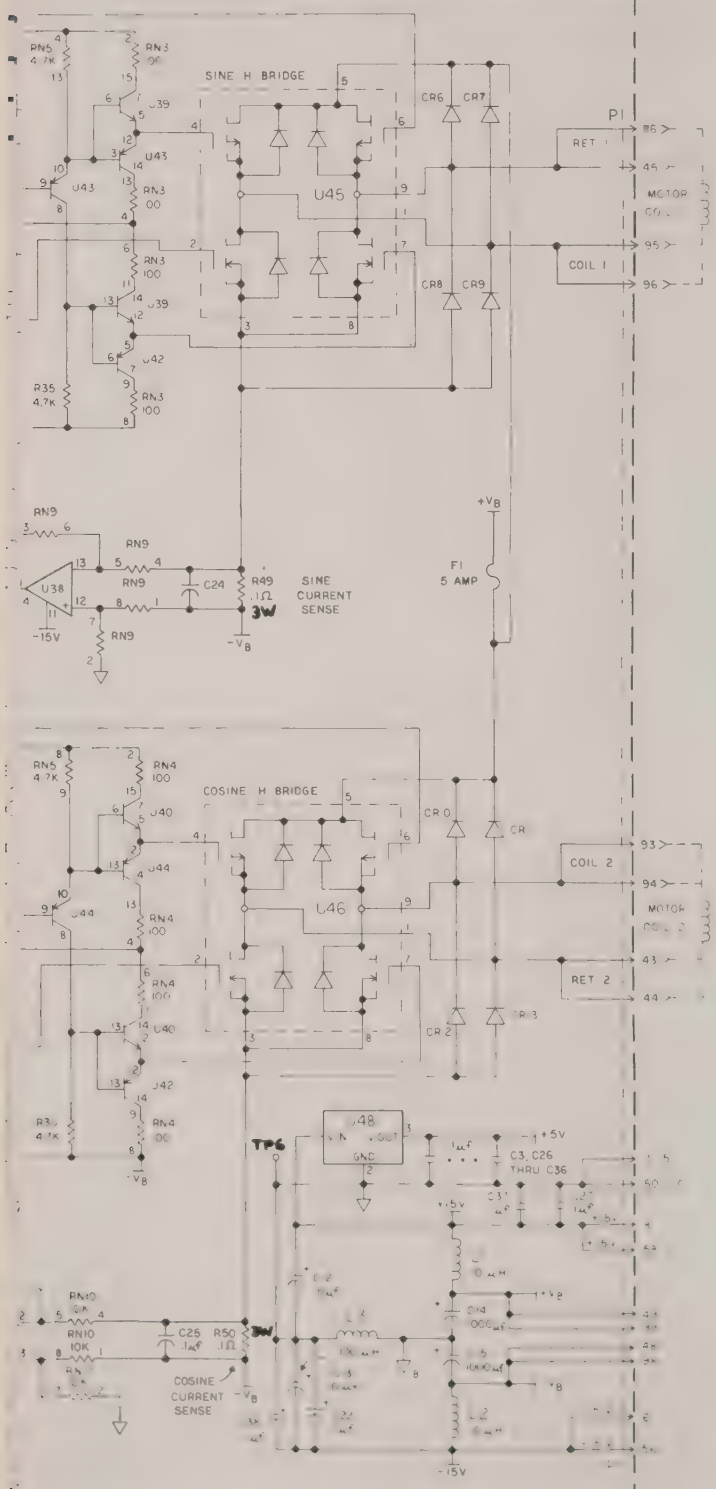
BOARD ASS'Y., STEPPER CONTROL 897658

BY	DATE	NAME	Gould Inc Instruments Division Cleveland, Ohio, 44114 U.S.A.
DR C. BRENNEMAN	1-29-87	SCHEMATIC	
	1-30-87	CODE IDENT 96795	DWG NO 297658
	1-30-87	ISSUE CODE G	SHEET 1 OF 2


+5V
RN2 10K
U26
74HC74
SET
CLR
VCC
GND
ENABLE SINE H BRIDGE
ENABLE COSINE H BRIDGE
RI1 2.2K
U33
LM339
RN7 10K
U47
74LS26
U24
74HC393
RESET
CA
CB
Q4A
Q1B
U7
~31.5 KHz SQUARE WAVE, CHOPPER SWITCHING FREQUENCY
SINE DAC REFERENCE VOLTAGE WAVEFORM
COSINE DAC REFERENCE VOLTAGE WAVEFORM
C7 100pf
C8 100pf
R18 10K
C21 .1μf
C23 .1μf
+10 VREF
+15V
-15V
R12, 3.3K
R13, 10K
R22 2.2K
R23 3.3K
R24
R31 10K
CR2
CR3
CR4
CR5
TL084
U35
+VB
-VB
RN5 4.7K
RN3 100
RN4 100
U39
U43
U42
U40
U44
U28
R17 4.7K
R28 4.7K
R55 200K
R56 10K
R57 10K
R58 200K
R59 10K
R60, 10K
U38
RN10 10K
SINE
SINE
COSINE
COSINE
STOP REWIND
RESET
E CLOCK

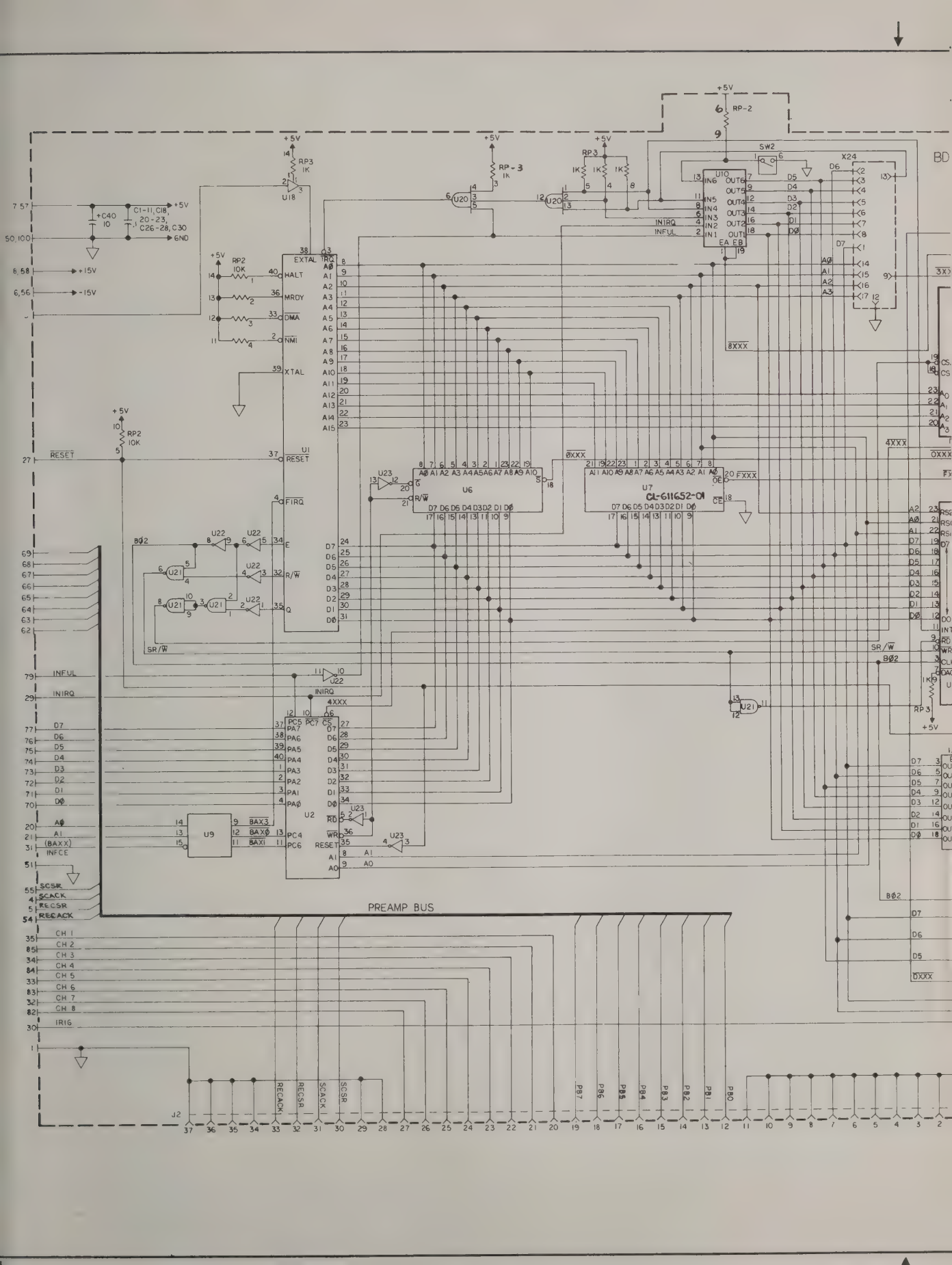
REVISIONS		F-1
SYM	DESCRIPTION	DATE

BOARD ASS'Y., STEPPER CONTROL 897658



BOARD ASS'Y., STEPPER CONTROL 897658

BY	DATE	NAME	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
DR C. BREMENOUR	1-30-87	SCHEMATIC	
R. Sweatt	1-30-87		
JD Wendell	1/30/87	CODE IDENT 96795	DWG NO 297658
		ISSUE CODE G	SHEET 2 OF 2


+5V
RP-2
RP3
1K
RP-3
SW2
X24
U10
INIRQ
INFUL
EA EB
C1-11,C18,
20-23,
C26-28,C30
+C40
10
+15V
-15V
GND
RP2
10K
HALT
MRDY
DMA
NMI
XTAL
EXTAL
IRQ
RESET
FIRQ
E
R/W
Q
U6
U7
CL-611652-01
8XXX
ØXXX
FXXX
4XXX
BØ2
SR/W
INFUL
INIRQ
INFCE
SCSR
SCACK
RECSR
RECACK
PREAMP BUS
CH 1
CH 2
CH 3
CH 4
CH 5
CH 6
CH 7
CH 8
IRIG
J2
P87
P86
P85
P84
P83
P82
P81
P80

REVISIONS		
SYM	DESCRIPTION	DATE
H	NOT AFFECTED PER DCN K1-0048 34386	8-4-87

ASSY., IEEE-488 INTERFACE 897727

DESIG	TYPE	VCC	VSS
U1	6809P		
U2	8255A	26	7
U3	6850	12	1
U4, 10	74HC244	20	10
U5	4020	16	8
U6	6551	24	2
U7	SEE U1	24	2
U8	74HC154	24	12
U9	74HC139	16	8
U11	4MHZ OSC	14	7
U12	8291A	40	20

DESIG	TYPE	VCC	VSS
U3, 14, U15, 16	3448	6	8
U18	74HC126	14	7
U20	74HC11	14	7
U21	74HC00	14	7
U22, 23	74HC04	14	7
U27	1489	14	7
U28	4001	14	7
U26	1488 +15V=14		7
U26	1488 -15V=1		7

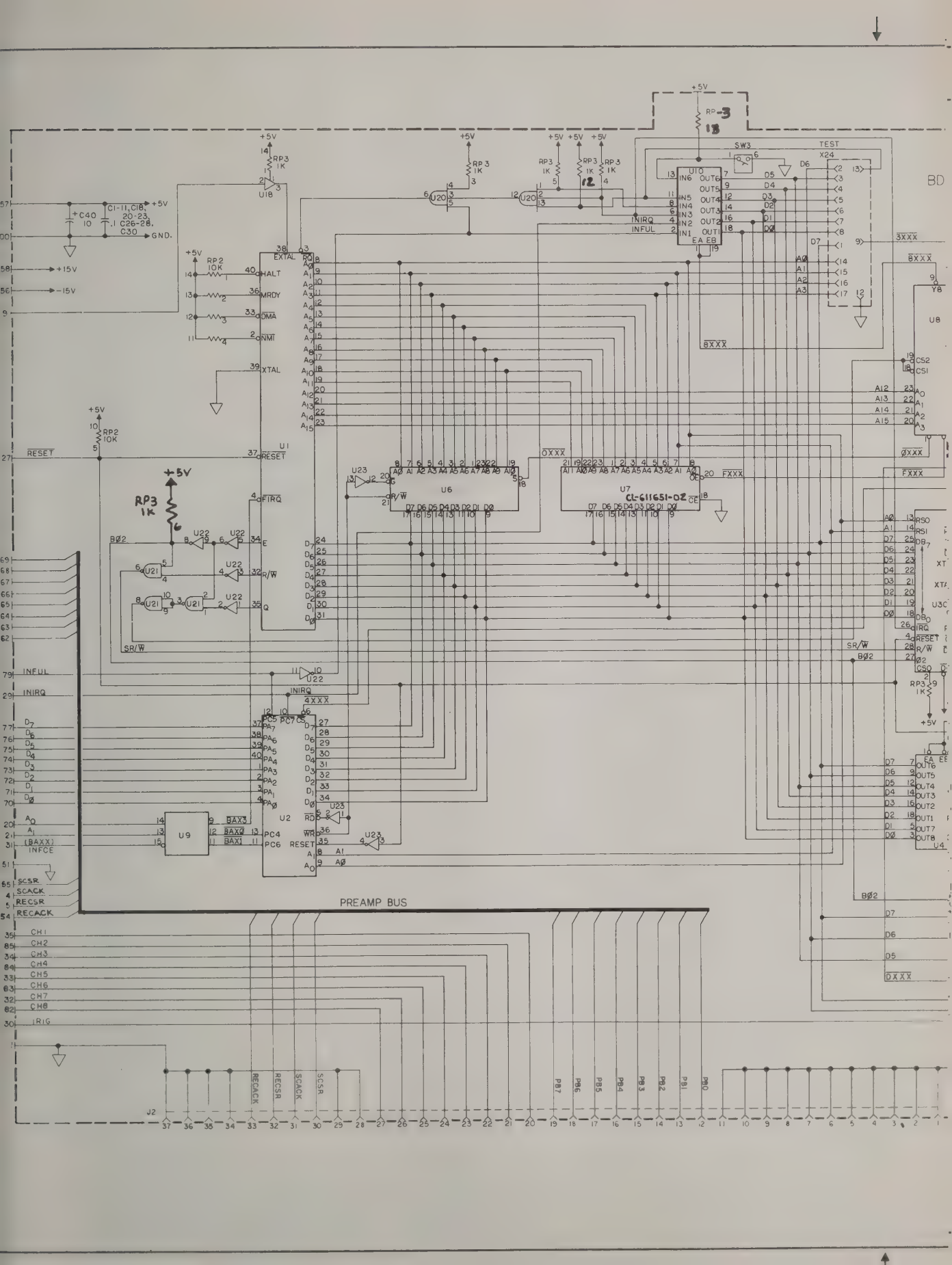
PART OF X25

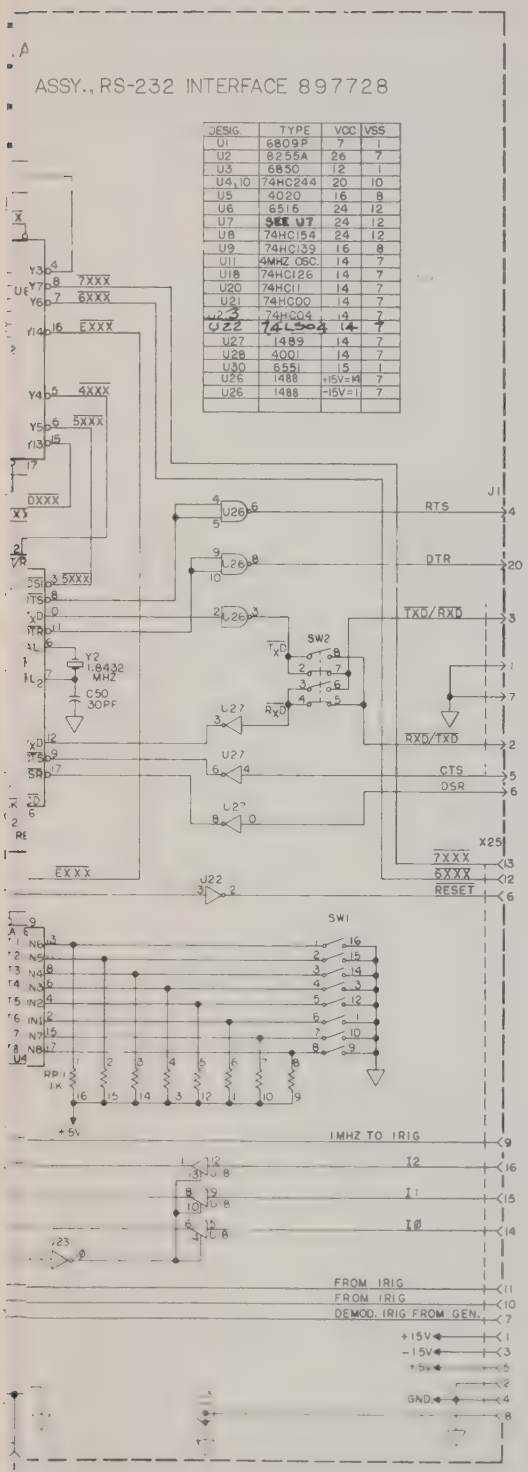
DXXX
8XXX
7XXX
6XXX
CXXX
2XXX
RESET
+5V
1MHZ TO IRIG
FROM IRIG
FROM IRIG
DEMOD. IRIG FROM GEN.
+15V
-15V
+5V
GND

BOARD ASSY., IEEE-488 INTERFACE 897727

BY	DATE	NAME
BRENEMOORE	11-26	SCHEMATIC
		CODE IDENT 96795
		SIZE G

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.
DWG NO 297727


+5V
RP-3
1K
SW3
TEST
X24
BD
U18
U20
U10
RP3
RP2
10K
C1-11,C18, 20-23, C26-28, C30
+C40
10
.1
GND.
+15V
-15V
EXTAL
XTAL
HALT
MRDY
DMA
NMI
RESET
IRQ
E
R/W
Q
SR/W
BØ2
INFUL
INIRQ
4XXX
8XXX
ØXXX
FXXX
DXXX
U1
U2
U3
U4
U6
U7
U8
U9
U21
U22
U23
CL-611651-02
PC5
PC7
PA7
PA6
PA5
PA4
PA3
PA2
PA1
PA0
PC4
PC6
RESET
RD
WR
BAX3
BAXØ
BAX1
(BAXX)
INFCE
SCSR
SCACK
RECSR
RECACK
PREAMP BUS
CH1
CH2
CH3
CH4
CH5
CH6
CH7
CH8
IRIG
J2
PB7
PB6
PB5
PB4
PB3
PB2
PB1
PB0

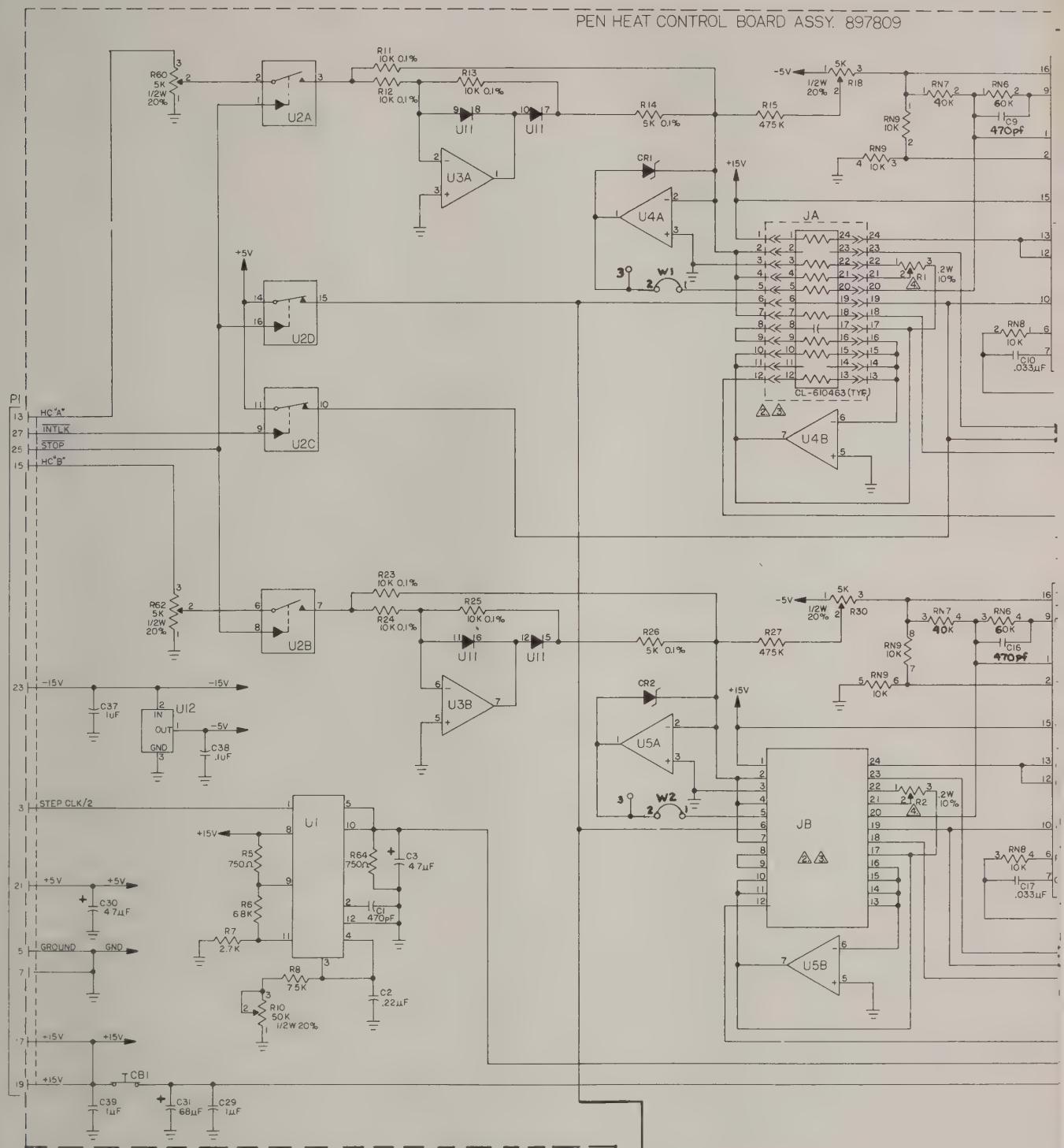


H1 H2	U7 WAS: -01 U22 WAS: 74HC04 PER DCN 34641. KISHER	11/16/87

297728

BOARD ASS'Y, RS-232 INTERFACE 897728

BY	DATE	NAME	Gould Inc. Instruments Division
DR BREMENOUR	12/84	SCHEMATIC	
CH Swartz	12/84	CODE IDENT 96795	DWG NO. 297728
APP J. Motta	12/84	ISSUE G	



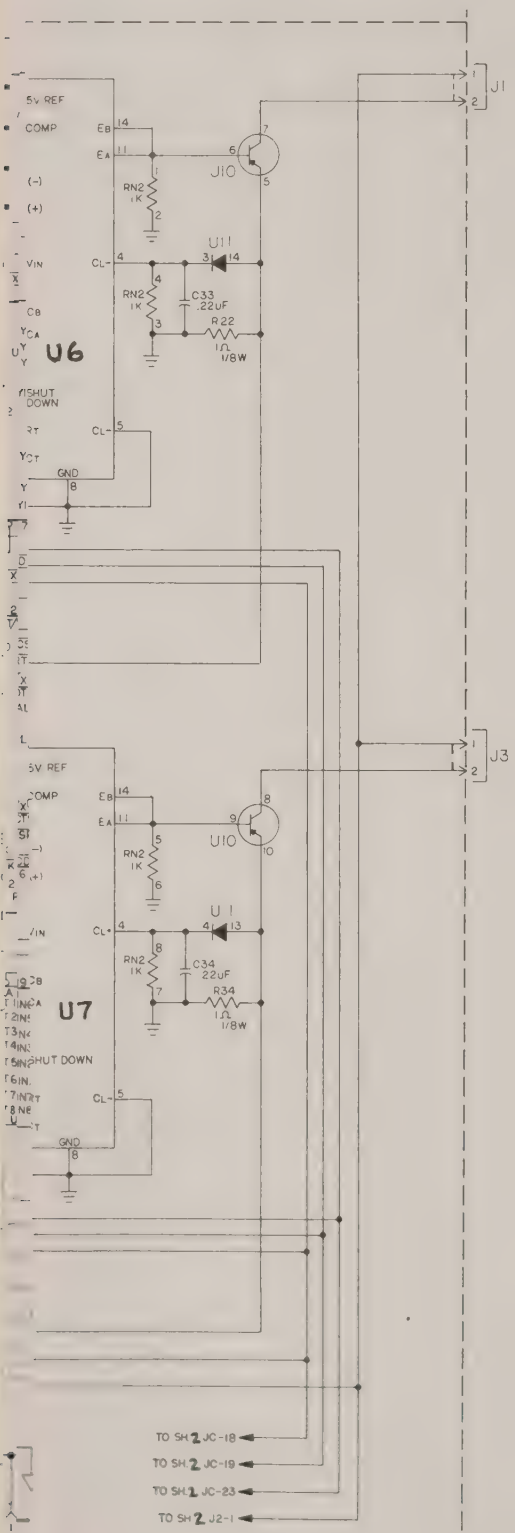
CL-610463 PEN ADAPTER MODULE ASSEMBLY USED ON PEN HEAT CONTROL BOARD ASSEMBLY 897809-1.

UNLESS OTHERWISE INDICATED:

ALL CAPACITANCE IN MICROFARADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS ARE 1/4W, 1%

4. USER TRACE DENSITY ADJUST.

3. CL-610464 PEN ADAPTER MODULE ASSEMBLY USED ON PEN HEAT CONTROL BOARD ASSEMBLY 897809-2.

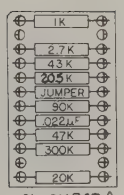


L-1	REVISED PER DCN 34306/A.S.	8-26-97

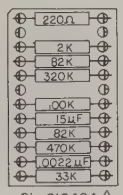
PEN HEAT CONTROL BOARD ASSY 897809

J. KOCHIS 8-7	NAME SCHEMATIC	Gould Inc Instruments Division	
	CODE IDENT 96795	SCALE G	DWG NO 297809 SHEET 1 OF 2

PEN HEAT CONTROL BOARD ASSY. 897809

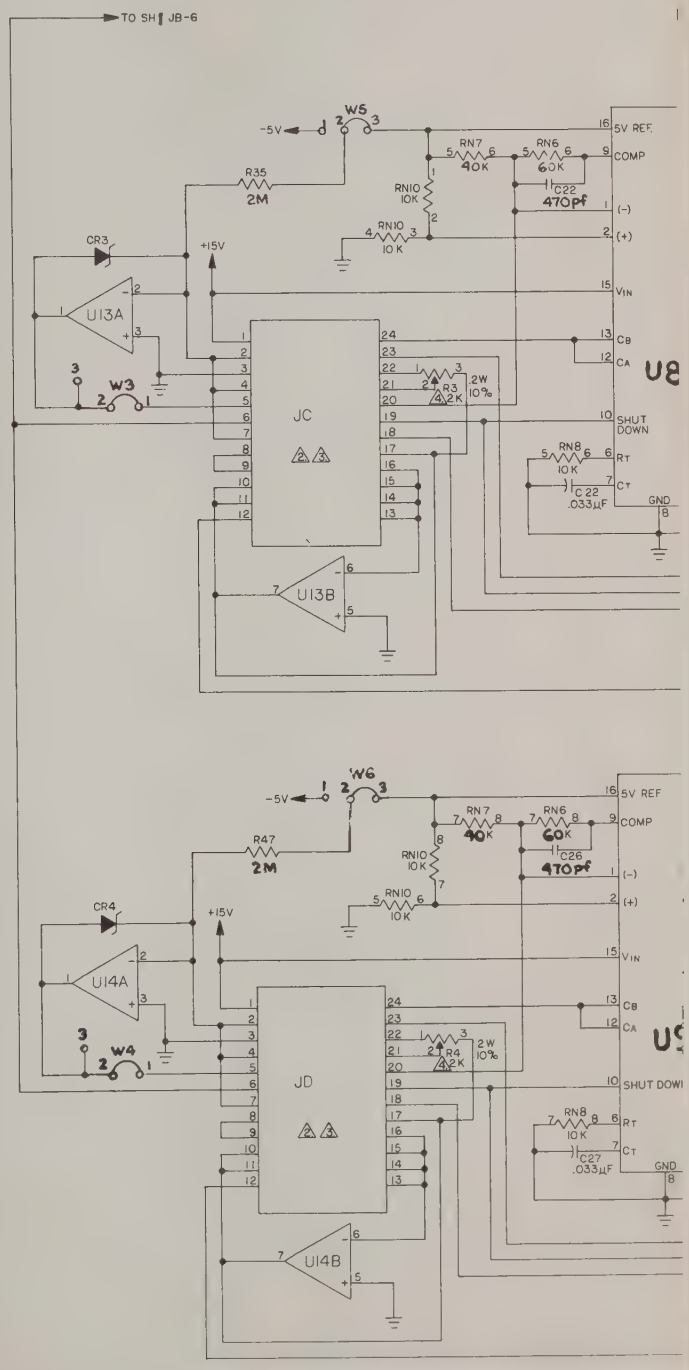


CL-611847 ⚠2

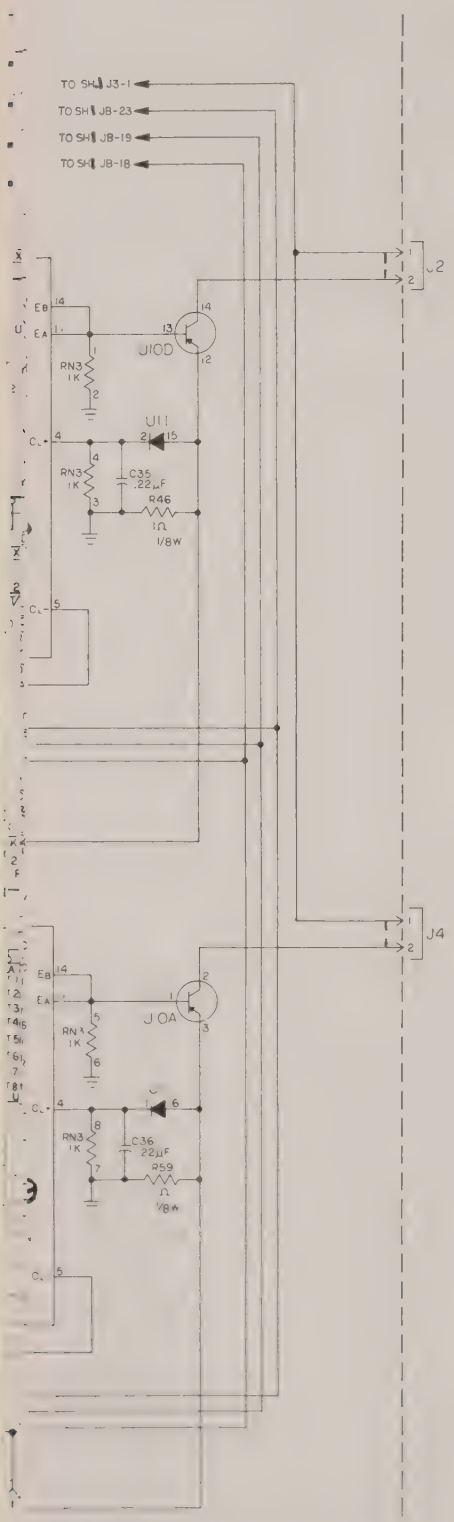


CL-610464 ⚠3

DEVICE	+15V	-15V	+5V	-5V	GND	DESIGNATION
LM2917	8	—	—	—	2	U1
LF13333	12	5	—	—	4	U2
LT1013DN8	8	4	—	—	—	U3,4,5,13,14
LM3524N	15	—	—	—	8	U6,7,8,9
MPQ3725	—	—	—	—	—	U10
FSA2619P	—	—	—	—	—	U11
MC79L05CP	—	2	—	—	1	U12
CL-611847	—	—	—	—	—	U13,14,15,16 ⚠2
CL-610464	—	—	—	—	—	U13,14,15,16 ⚠3



REVISIONS		
SYM	DESCRIPTION	DATE



PEN HEAT CONTROL BOARD ASS'Y. 897809

BY	DATE
J. Kochis	12-8
K. Durant	1-14-87
F. Smith	1-20-87

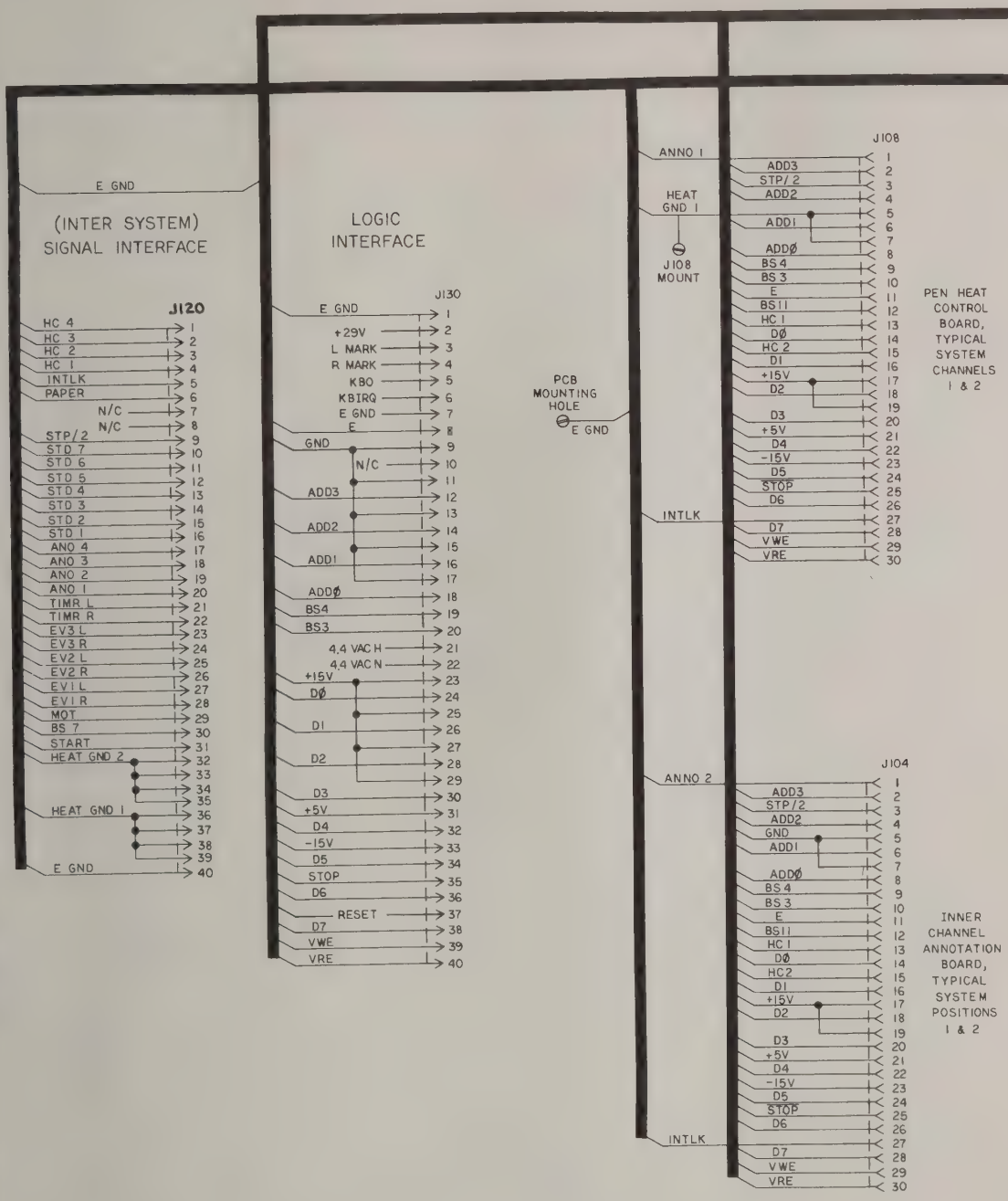
NAME: SCHEMATIC

Gould Inc
Instruments Division

CODE IDENT: 96795 | ISSUE: G

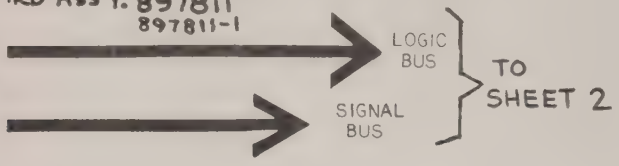
DWG NO: 297809

SHEET 2 OF 2


E GND
(INTER SYSTEM)
SIGNAL INTERFACE
J120
HC 4 1
HC 3 2
HC 2 3
HC 1 4
INTLK 5
PAPER 6
N/C 7
N/C 8
STP/2 9
STD 7 10
STD 6 11
STD 5 12
STD 4 13
STD 3 14
STD 2 15
STD 1 16
ANO 4 17
ANO 3 18
ANO 2 19
ANO 1 20
TIMR L 21
TIMR R 22
EV3 L 23
EV3 R 24
EV2 L 25
EV2 R 26
EV1 L 27
EV1 R 28
MOT 29
BS 7 30
START 31
HEAT GND 2 32 33 34 35
HEAT GND 1 36 37 38 39
E GND 40
LOGIC
INTERFACE
J130
E GND 1
+29V 2
L MARK 3
R MARK 4
KBD 5
KBIRQ 6
E GND 7
E 8
GND 9
N/C 10 11
ADD3 12
ADD2 13 14 15
ADD1 16 17
ADDØ 18
BS4 19
BS3 20
4.4 VAC H 21
4.4 VAC N 22
+15V 23
DØ 24 25
D1 26 27
D2 28 29
D3 30
+5V 31
D4 32
-15V 33
D5 34
STOP 35
D6 36
RESET 37
D7 38
VWE 39
VRE 40
PCB
MOUNTING
HOLE
E GND
ANNO 1
HEAT
GND 1
J108
MOUNT
J108
ADD3 1
STP/2 2
ADD2 3 4
ADD1 5 6 7
ADDØ 8
BS 4 9
BS 3 10
E 11
BS11 12
HC 1 13
DØ 14
HC 2 15
D1 16
+15V 17 18 19
D2
D3 20
+5V 21
D4 22
-15V 23
D5 24
STOP 25
D6 26
INTLK
D7 27
VWE 28
VRE 29 30
PEN HEAT
CONTROL
BOARD,
TYPICAL
SYSTEM
CHANNELS
1 & 2
ANNO 2
J104
ADD3 1
STP/2 2
ADD2 3 4
GND 5
ADD1 6 7
ADDØ 8
BS 4 9
BS 3 10
E 11
BS11 12
HC 1 13
DØ 14
HC2 15
D1 16
+15V 17 18 19
D2
D3 20
+5V 21
D4 22
-15V 23
D5 24
STOP 25
D6 26
INTLK
D7 27
VWE 28
VRE 29 30
INNER
CHANNEL
ANNOTATION
BOARD,
TYPICAL
SYSTEM
POSITIONS
1 & 2

REVISIONS		
SYM	DESCRIPTION	DATE
F	ORIGINAL RELEASE DCN 33743 SWARTZ	12-29-86
G-1	REV'D PER DCN 33969	4-6-87
H	REVISED PER DCN 34426/A SOTEROS	10-1-87

IRD ASS'Y. 897811
897811-1



1297811 1

897811-1
BOARD ASS'Y., MOTHER-IN-LAW 897811

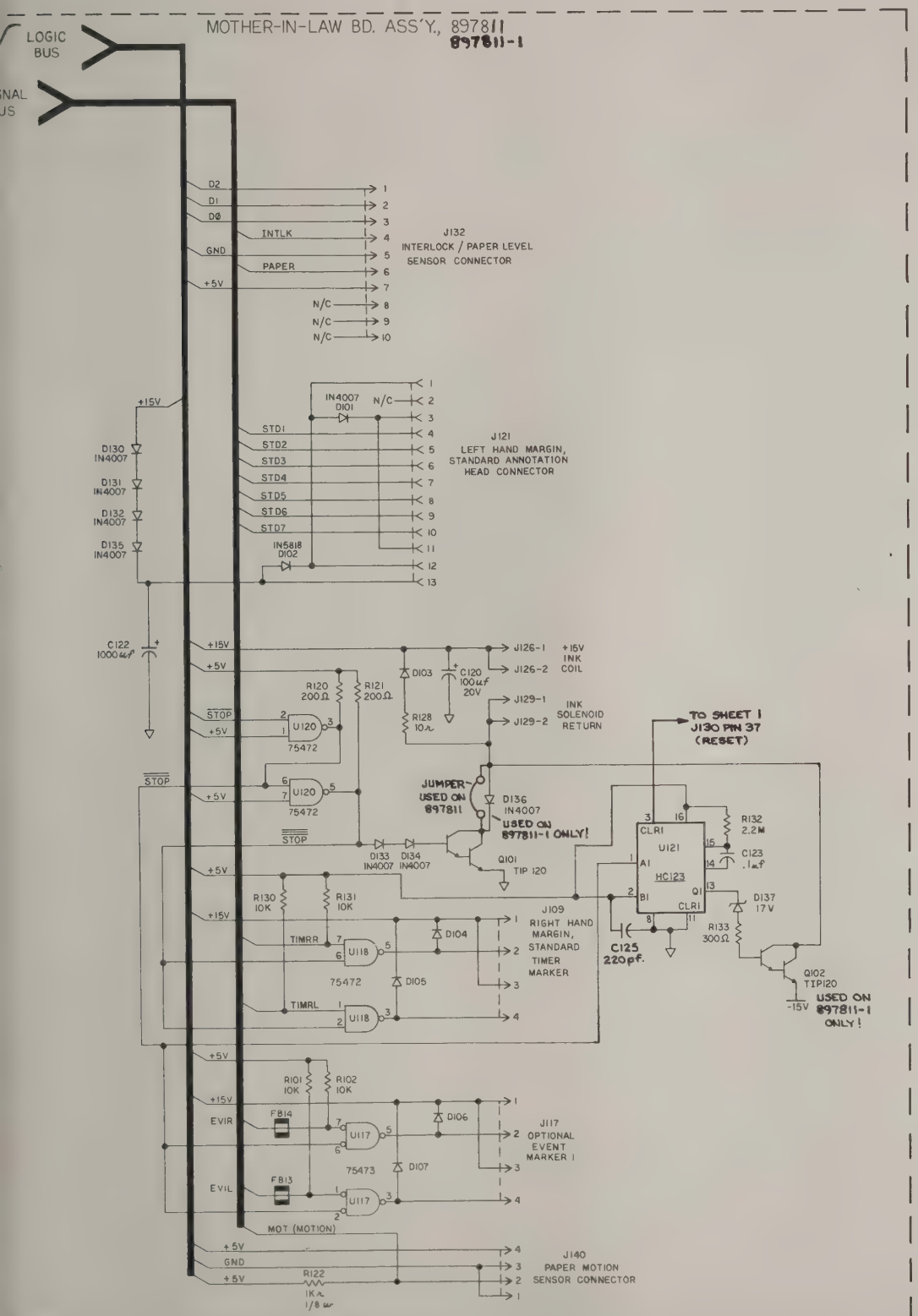
BY	DATE
DR BREMENOU R	12-29-86
H. Swartz	12-29-86
	2-3-87

NAME: SCHEMATIC

CODE IDENT: 96795 ISSUE CODE: G

Gould Inc.
Instruments Division
Everett, Ohio 44114 U.S.A.

DWG NO. 297811
SHEET 1 OF 2


MOTHER-IN-LAW BD. ASS'Y., 897811
897811-1
LOGIC BUS
D2
D1
D0
INTLK
GND
PAPER
+5V
N/C
N/C
N/C
J132
INTERLOCK / PAPER LEVEL SENSOR CONNECTOR
+15V
D130 IN4007
D131 IN4007
D132 IN4007
D135 IN4007
IN4007 D101
IN5818 D102
STD1
STD2
STD3
STD4
STD5
STD6
STD7
J121
LEFT HAND MARGIN, STANDARD ANNOTATION HEAD CONNECTOR
C122 1000uf
J126-1 +15V INK COIL
J126-2
D103
C120 100uf 20V
R120 200Ω
R121 200Ω
R128 10Ω
J129-1
J129-2 INK SOLENOID RETURN
STOP
U120
75472
JUMPER-USED ON 897811
D136 IN4007
USED ON 897811-1 ONLY!
TO SHEET 1 J130 PIN 37 (RESET)
D133 IN4007
D134 IN4007
Q101 TIP 120
U121 HC123 CLR1 A1 B1 Q1
R132 2.2M
C123 .1uf
D137 17V
R133 300Ω
C125 220pf.
Q102 TIP120
-15V
USED ON 897811-1 ONLY!
R130 10K
R131 10K
TIMRR
TIMRL
U118
75472
D104
D105
J109
RIGHT HAND MARGIN, STANDARD TIMER MARKER
R101 10K
R102 10K
EVIR
EVIL
FB14
FB13
U117
75473
D106
D107
J117
OPTIONAL EVENT MARKER 1
MOT (MOTION)
GND
R122 1K 1/8w
J140
PAPER MOTION SENSOR CONNECTOR

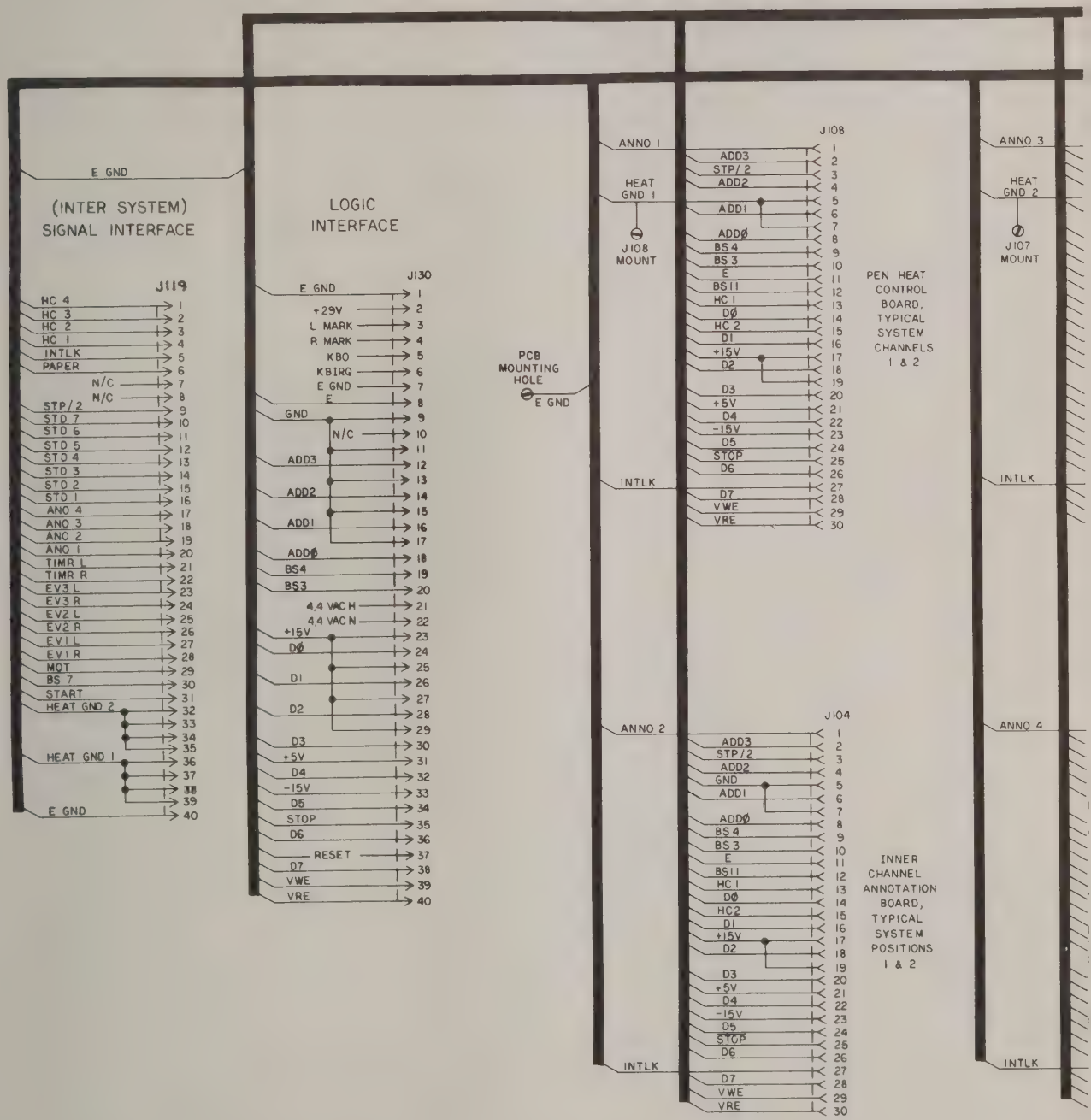
REVISIONS H		
SYM	DESCRIPTION	DATE

897811-1

BOARD ASS'Y., MOTHER-IN-LAW 897811 2 CH.

BY	DATE	NAME	Gould Inc Instruments Division
BREMENOUR	12-78	SCHEMATIC	Cleveland, Ohio 44114, U.S.A.
K. SWARTZ	12-78		DWG NO 297811
J. O'DONNELL	12-78	CODE IDENT 96795 / SIZE CODE G	SHEET 2 OF 2

297811


(INTER SYSTEM)
SIGNAL INTERFACE
LOGIC
INTERFACE
E GND
J119
HC 4
HC 3
HC 2
HC 1
INTLK
PAPER
N/C
N/C
STP/2
STD 7
STD 6
STD 5
STD 4
STD 3
STD 2
STD 1
ANO 4
ANO 3
ANO 2
ANO 1
TIMR L
TIMR R
EV3 L
EV3 R
EV2 L
EV2 R
EV1 L
EV1 R
MOT
BS 7
START
HEAT GND 2
HEAT GND 1
E GND
J130
E GND
+29V
L MARK
R MARK
KBO
KBIRQ
E GND
E
GND
N/C
ADD3
ADD2
ADD1
ADDØ
BS4
BS3
4.4 VAC H
4.4 VAC N
+15V
DØ
D1
D2
D3
+5V
D4
-15V
D5
STOP
D6
RESET
D7
VWE
VRE
PCB
MOUNTING
HOLE
E GND
ANNO 1
HEAT
GND 1
J108
MOUNT
INTLK
ANNO 2
INTLK
J108
ADD3
STP/2
ADD2
ADD1
ADDØ
BS4
BS3
E
BS11
HC1
DØ
HC2
D1
+15V
D2
D3
+5V
D4
-15V
D5
STOP
D6
D7
VWE
VRE
PEN HEAT
CONTROL
BOARD,
TYPICAL
SYSTEM
CHANNELS
1 & 2
J104
ADD3
STP/2
ADD2
GND
ADD1
ADDØ
BS4
BS3
E
BS11
HC1
DØ
HC2
D1
+15V
D2
D3
+5V
D4
-15V
D5
STOP
D6
D7
VWE
VRE
INNER
CHANNEL
ANNOTATION
BOARD,
TYPICAL
SYSTEM
POSITIONS
1 & 2
ANNO 3
HEAT
GND 2
J107
MOUNT
INTLK
ANNO 4
INTLK

REVISIONS		
SYM	DESCRIPTION	DATE
G	ORIGINAL RELEASE DCN 33744 RIVERA	12-19-86
H-1	REV'D PER DCN 33970	4-6-87
J	REVISED PER DCN 34426/A. SOTEROS	10-1-87

/ BOARD ASS'Y. 897812 & 897812-1

LOGIC BUS

SIGNAL BUS

TO SHEET 2

J107

ADD3	1
STP/2	2
ADD2	3
	4
ADD1	5
	6
ADDØ	7
BS 4	8
BS 3	9
E	10
BS11	11
HC 3	12
DØ	13
HC 4	14
D1	15
+15V	16
D2	17
	18
D3	19
+5V	20
D4	21
-15V	22
D5	23
STOP	24
D6	25
	26
D7	27
VWE	28
VRE	29
	30

PEN HEAT CONTROL BOARD, TYPICAL SYSTEM CHANNELS 3 & 4

J103

ADD3	1
STP/2	2
ADD2	3
GND	4
ADD1	5
	6
ADDØ	7
BS 4	8
BS 3	9
E	10
BS11	11
HC 3	12
DØ	13
HC 4	14
D1	15
+15V	16
D2	17
	18
D3	19
+5V	20
D4	21
-15V	22
D5	23
STOP	24
D6	25
	26
D7	27
VWE	28
VRE	29
	30

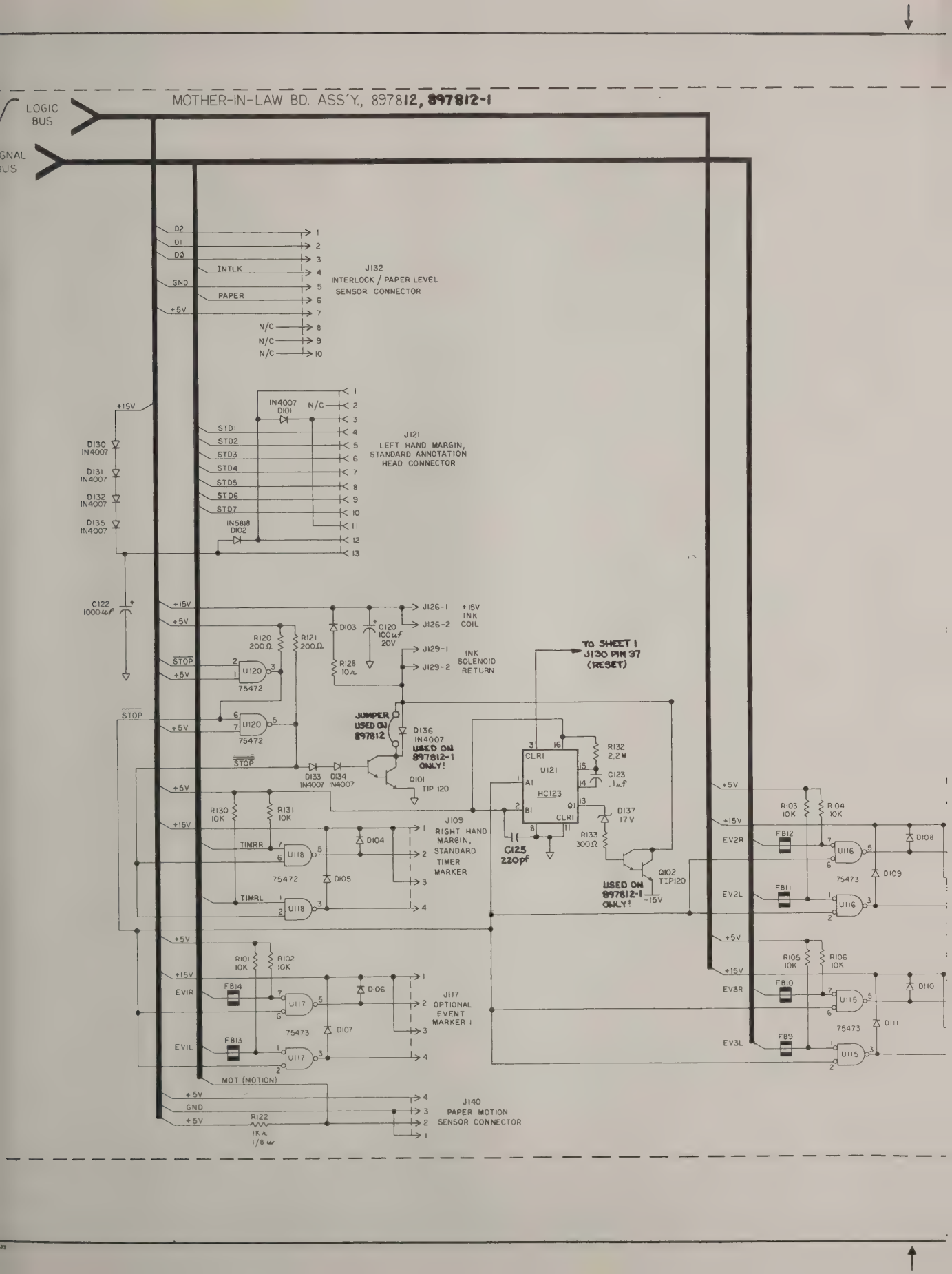
INNER CHANNEL ANNOTATION BOARD, TYPICAL SYSTEM POSITIONS 3 & 4

897812-1

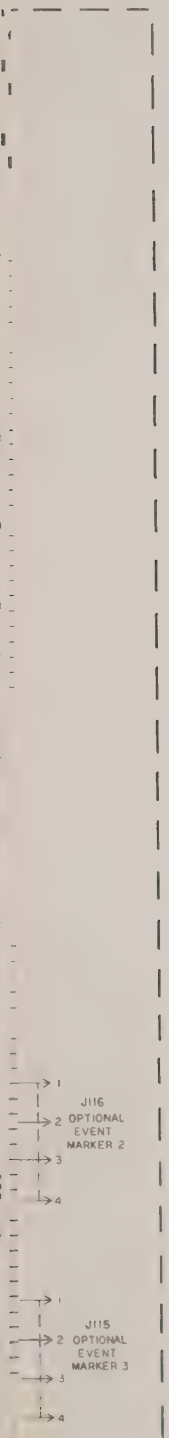
BOARD ASS'Y., MOTHER-IN-LAW 897812 4 CH

BREMENOUR	11-86	SCHEMATIC	Gould Inc. Instruments Division Chatsworth, Chs 91311-USA
		96795	297812
			SHEET 1 OF 2

297812-1


MOTHER-IN-LAW BD. ASS'Y., 897812, 897812-1
LOGIC BUS
SIGNAL BUS
D2
D1
D0
INTLK
GND
PAPER
+5V
N/C
N/C
N/C
J132
INTERLOCK / PAPER LEVEL SENSOR CONNECTOR
+15V
D130 IN4007
D131 IN4007
D132 IN4007
D135 IN4007
C122 1000uf
IN4007 D101
N/C
STD1
STD2
STD3
STD4
STD5
STD6
STD7
IN5818 D102
J121
LEFT HAND MARGIN, STANDARD ANNOTATION HEAD CONNECTOR
D103
C120 100uf 20V
R128 10Ω
J126-1 +15V INK COIL
J126-2
J129-1 INK SOLENOID RETURN
J129-2
TO SHEET 1 J130 PIN 37 (RESET)
R120 200Ω
R121 200Ω
STOP
U120 75472
JUMPER USED ON 897812
D136 IN4007 USED ON 897812-1 ONLY!
Q101 TIP 120
D133 IN4007
D134 IN4007
U121 HC123
R132 2.2M
C123 .1uf
D137 17V
R133 300Ω
Q102 TIP120 USED ON 897812-1 ONLY!
-15V
C125 220pf
R130 10K
R131 10K
TIMRR
TIMRL
U118 75472
D104
D105
J109 RIGHT HAND MARGIN, STANDARD TIMER MARKER
R101 10K
R102 10K
EVIR
EVIL
FB14
FB13
U117 75473
D106
D107
J117 OPTIONAL EVENT MARKER 1
MOT (MOTION)
J140 PAPER MOTION SENSOR CONNECTOR
R122 1K Ω 1/8 w
R103 10K
R 04 10K
EV2R
EV2L
FB12
FB11
U116 75473
D108
D109
R105 10K
R106 10K
EV3R
EV3L
FB10
FB9
U115 75473
D110
D111

REVISIONS J		
SYM	DESCRIPTION	DATE



897812-1

BOARD ASS'Y., MOTHER-IN-LAW 897812 4 CH

BY	DATE
DR BREMENOR	11-86
CH H. SUMITE	12-18-88
APP D. Worrell	12-88

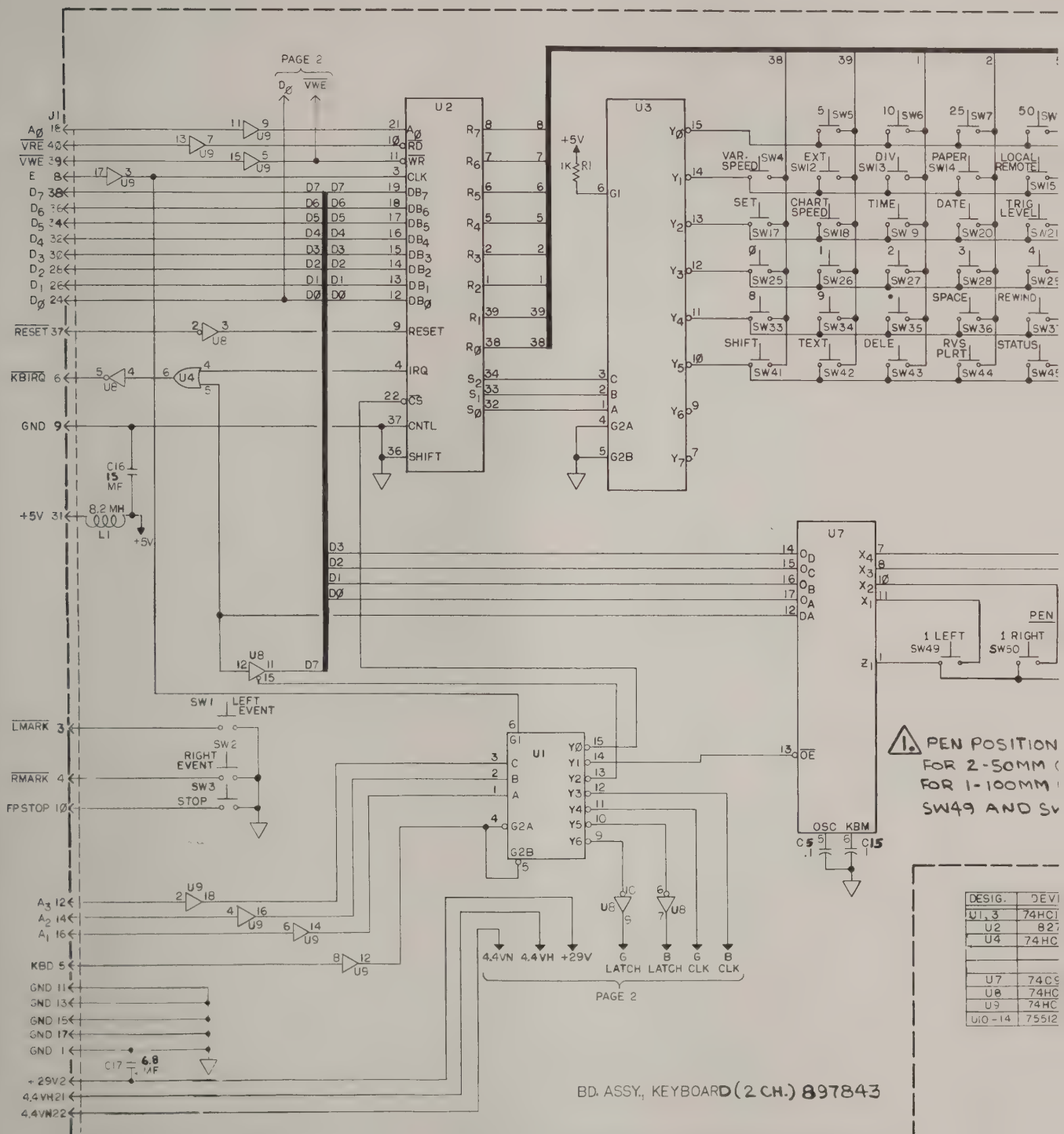
NAME SCHEMATIC

Gould Inc
Instruments Division
Cleveland, Ohio 44114 U.S.A.

CODE IDENT. 96795 | ISSUE CODE G

DWG NO 297812

SHEET 2 OF 2

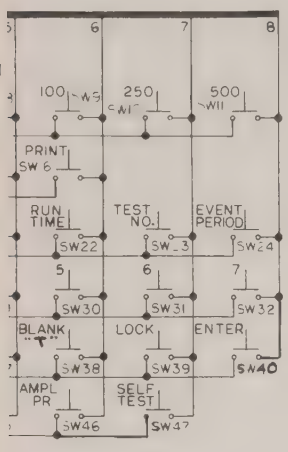


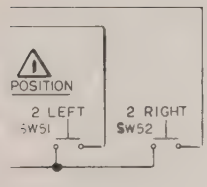
1. PEN POSITION
FOR 2-50MM (
FOR 1-100MM
SW49 AND SW

DESIG.	DEVI
U1, 3	74HC1
U2	827
U4	74HC
U7	74C9
U8	74HC
U9	74HC
U10-14	75512

NOTE: UNLESS OTHERWISE INDICATED:
ALL CAPACITANCE IN MICROFARADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS .15 WATT, 2%.

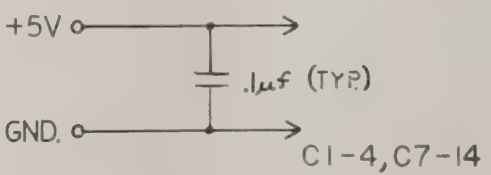
REVISIONS		
SYM	DESCRIPTION	DATE
D	ORIGINAL RELEASE DCN 33599 SWARTZ	11-10-86
E-1	REVISED PER DCN 34057/A. SOTEROS	5-20-87
F-1	NOT AFFECTED PER DCN 34298/A. SOTEROS	6-22-87





SWITCHES SHOWN ARE
H CONFIGURATION.
2H. CONFIGURATION,
JS2 ARE NOT USED.

CE	VCC	GND	COMMENTS
38	16	8	
9	40	20	
32	14	7	
22	18	9	
	16	8	
44	20	10	1.19 → CV
	6	15	16 +29V



297843

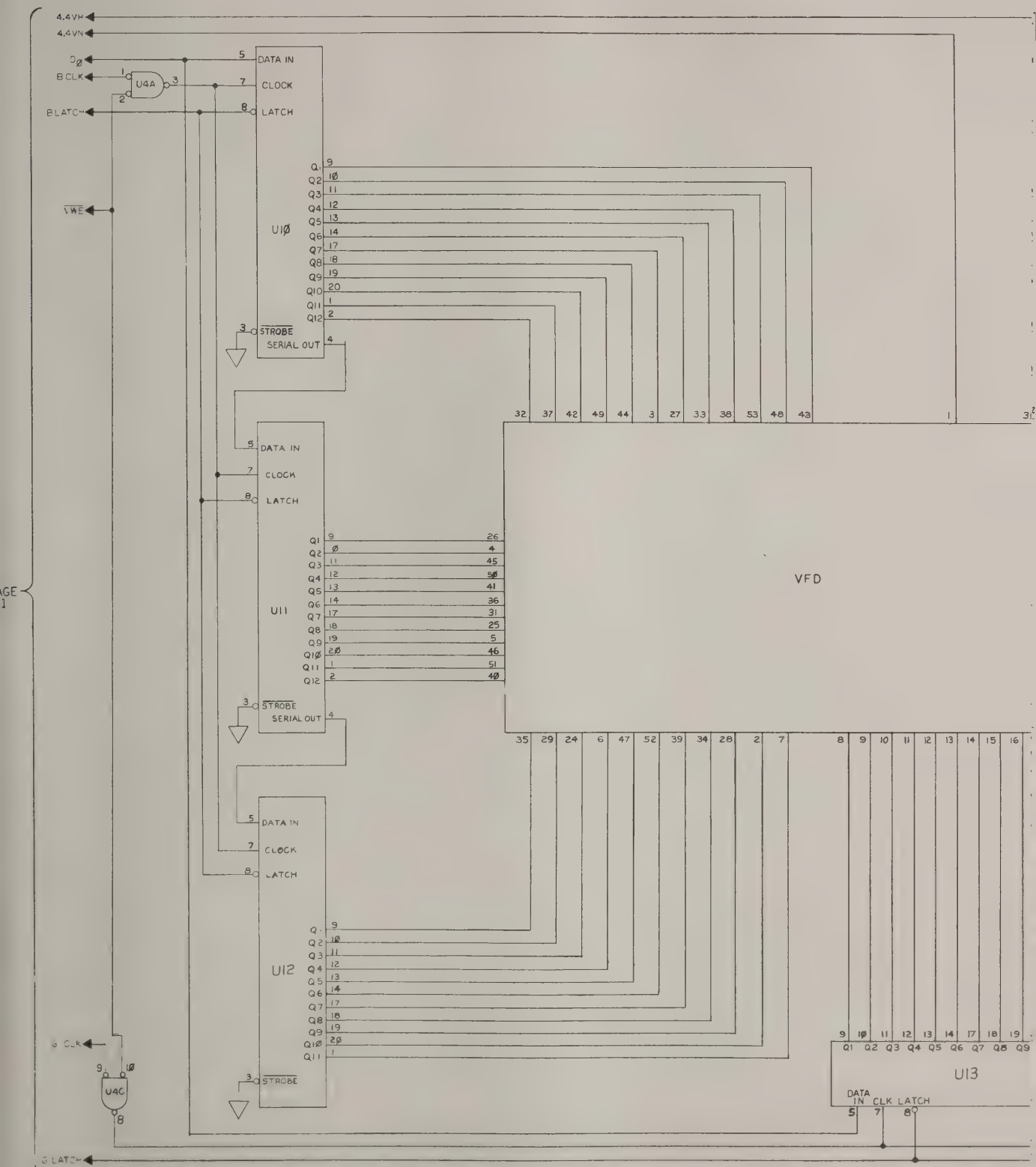
BOARD ASS'Y, KEYBOARD 897843

BY	DATE	NAME
CZECH	5/19/86	SCHEMATIC
Swartz	11/86	
	6/87	

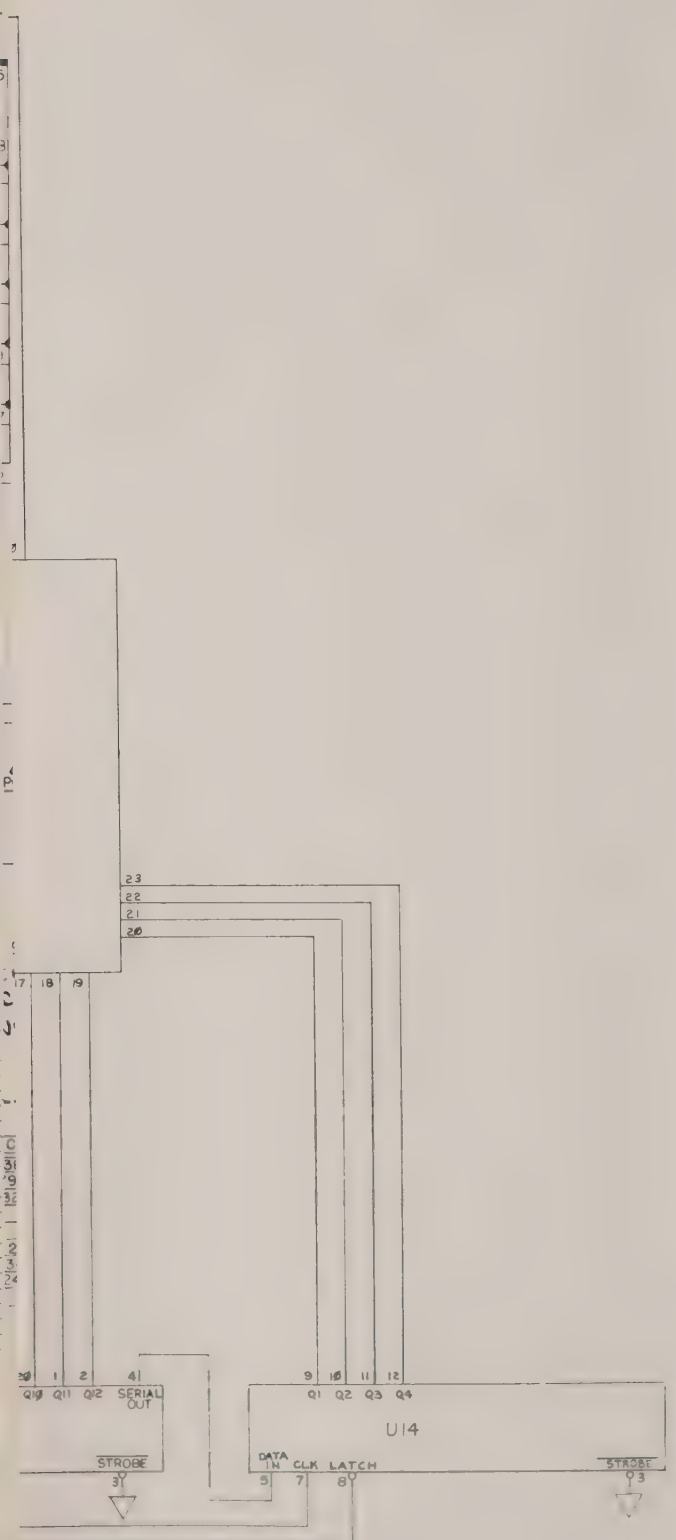
CODE IDENT 96795 | SIZE CODE G

Gould Inc
Instruments Division
Cleveland, Ohio 44114 U.S.A.

DWG. NO. 297843
SHT. 1 OF 2


4.4VH
4.4VN
BØ
BCLK
BLATCH
U4A
\WE
U1Ø
U11
U12
U13
U4C
DATA IN
CLOCK
LATCH
STROBE
SERIAL OUT
VFD
DATA IN CLK LATCH
GCLK
GLATCH

REVISIONS		F-1
SYM	DESCRIPTION	DATE

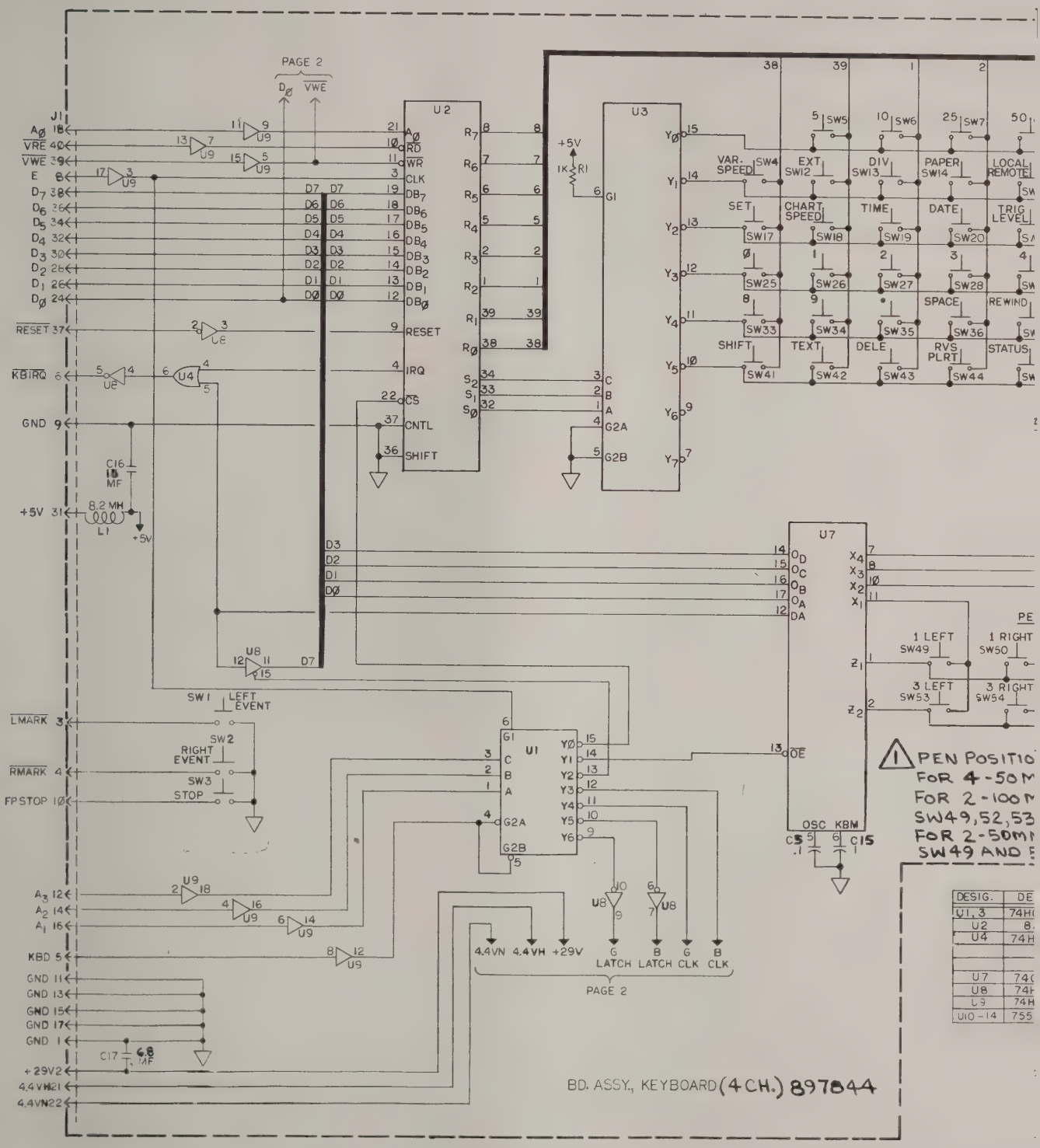


BY	DATE	NAME
CM CZECH	5-19-86	SCHEMATIC
CH	11/86	
	11/86	

CODE IDENT 96795 | ISSUE G

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.

DWG NO. 297343
SHT. 2 OF 2



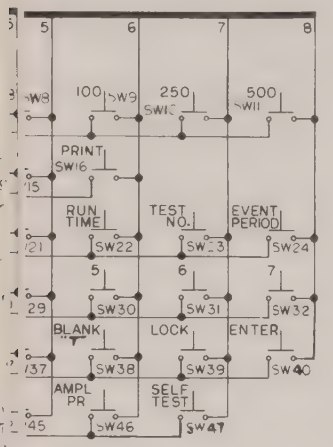
PEN POSITIO
FOR 4-50M
FOR 2-100M
SW49,52,53
FOR 2-50MM
SW49 AND

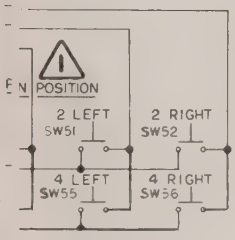
DESIG.	DE
U1, 3	74H(
U2	8.
U4	74H
U7	74(
U8	74H
U9	74H
U10-14	755

BD. ASSY., KEYBOARD (4 CH.) 897844

NOTE: UNLESS OTHERWISE INDICATED:
ALL CAPACITANCE IN MICROFARADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS .15 WATT, 2%.

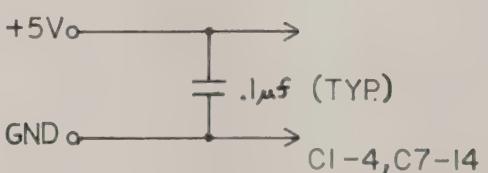
REVISIONS		
SYM	DESCRIPTION	DATE
D	ORIGINAL RELEASE DCN 33600 SWARTZ	11-10-86
E-1	REVISED PER DCN 34057/A SOTEROS	5-20-87
F-1	NOT AFFECTED PER DCN 34298/A SOTEROS	6-22-87





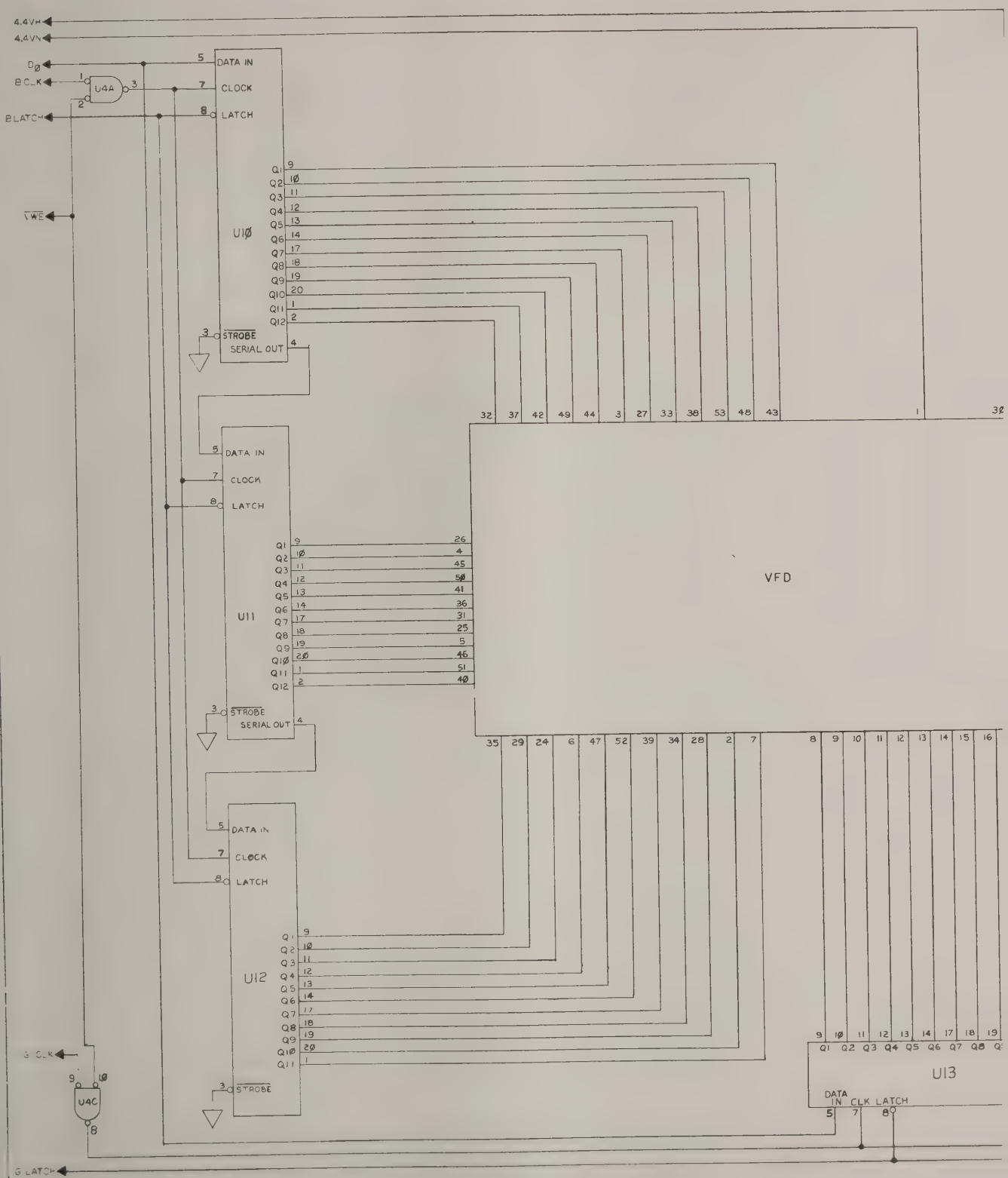
N SWITCHES SHOWN ARE
IM CH. CONFIGURATION.
IM CH. CONFIGURATION
AND 56 ARE NOT USED.
1,1-100MM CH. CONFIGURATION
52 ARE NOT USED.

VICE	VCC	GND	COMMENTS
138	16	8	
279	40	20	
032	14	7	
922	18	9	
	6	3	
244	20	10	1.19 → 0V
2	6	15	16 +29V

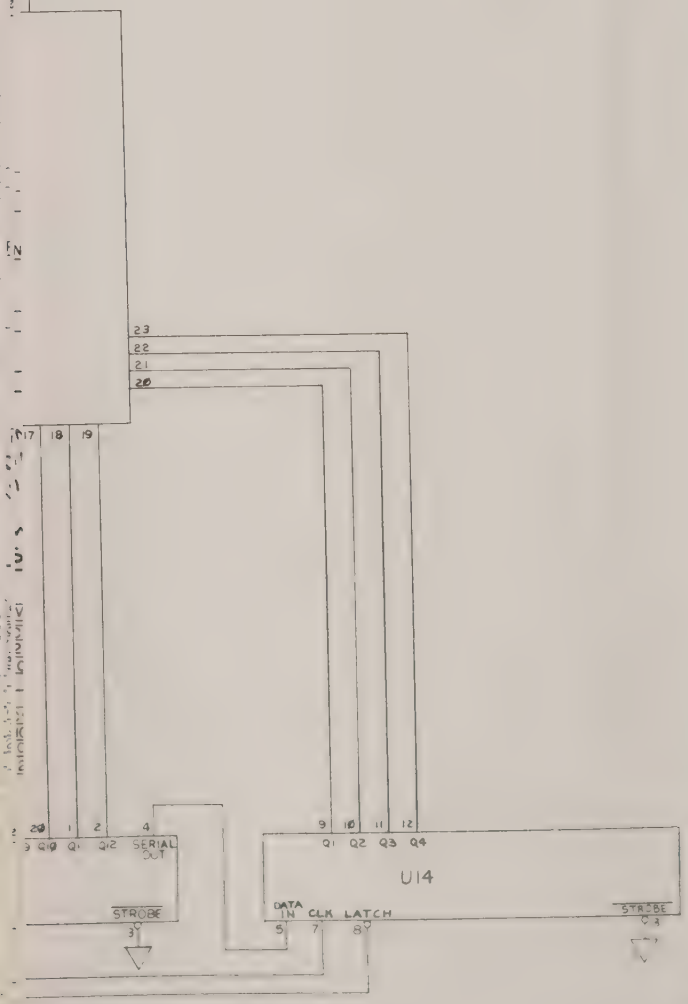


BOARD ASS'Y., KEYBOARD PART NO. 897844

BY	DATE	NAME	Gould Inc Instruments Division
CZECH	5-19-86	SCHEMATIC	
Swartz	11/86		
	11/86	CODE IDENT 96795	SIZE D
			DWG NO 297844
			SHT. 1 OF 2


4.4VM
4.4VN
DØ
BCLK
BLATCH
U4A
DATA IN
CLOCK
LATCH
WE
U1Ø
STROBE
SERIAL OUT
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
U11
U12
VFD
U13
DATA IN
CLK
LATCH
GCLK
U4C
GLATCH

REVISIONS		F-1
SYM	DESCRIPTION	DATE

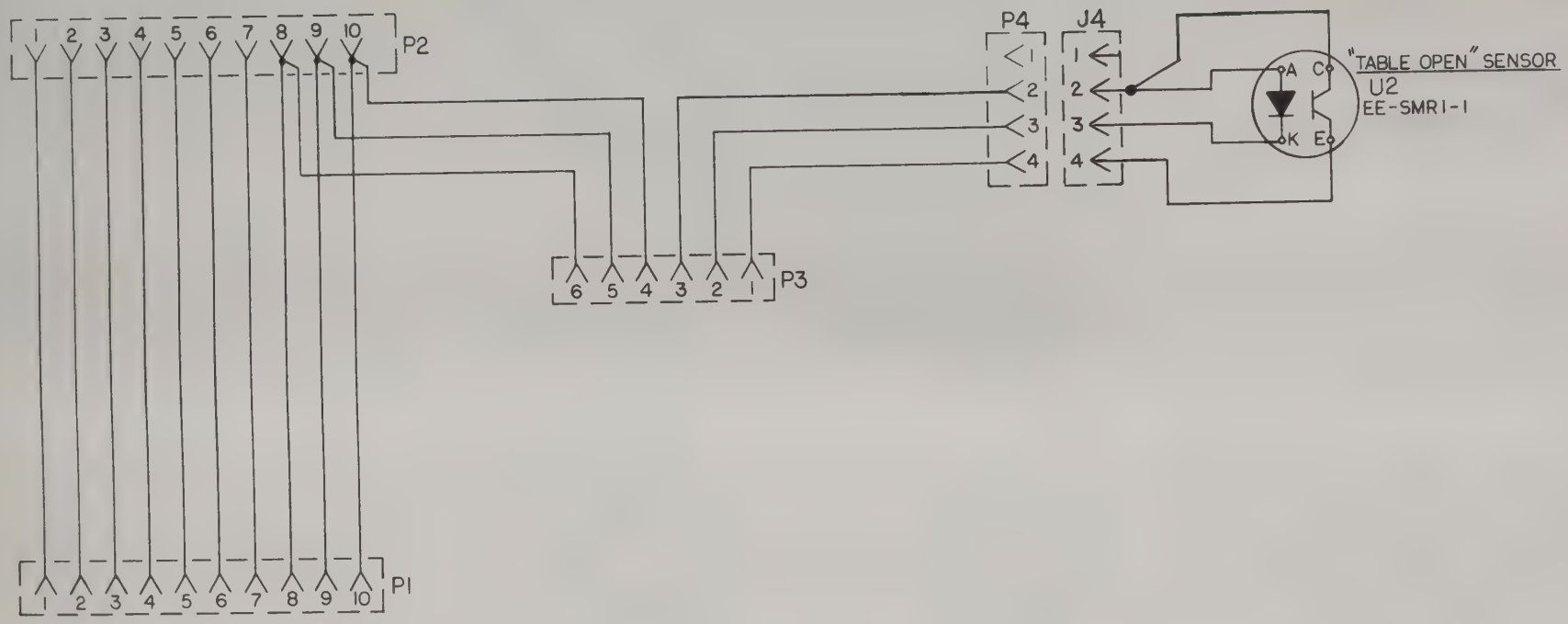


BOARD ASSY, KEYBOARD PART NO. 897844

	DATE	NAME	
CZECH	7-9-84	SCHEMATIC	Gould Inc Instruments Division Cleveland [illegible] U.S.A.
[illegible]	11/96		DWG. NO. 297844
[illegible]	11/96	CODE IDENT 96795	ISSUE CODE G SHT. 2 OF 2

REVISIONS		
SYM	DESCRIPTION	DATE
A	REVISED PER DCN 34467	3-1-87

PHOTO SENSOR CABLE ASSEMBLY 897912



CABLE ASSY., PHOTO SENSOR 897912

	BY	DATE
DR	J. ROCHAS	9-86
CH	Swartz	11-86
APP	F. ZAFF	11/86

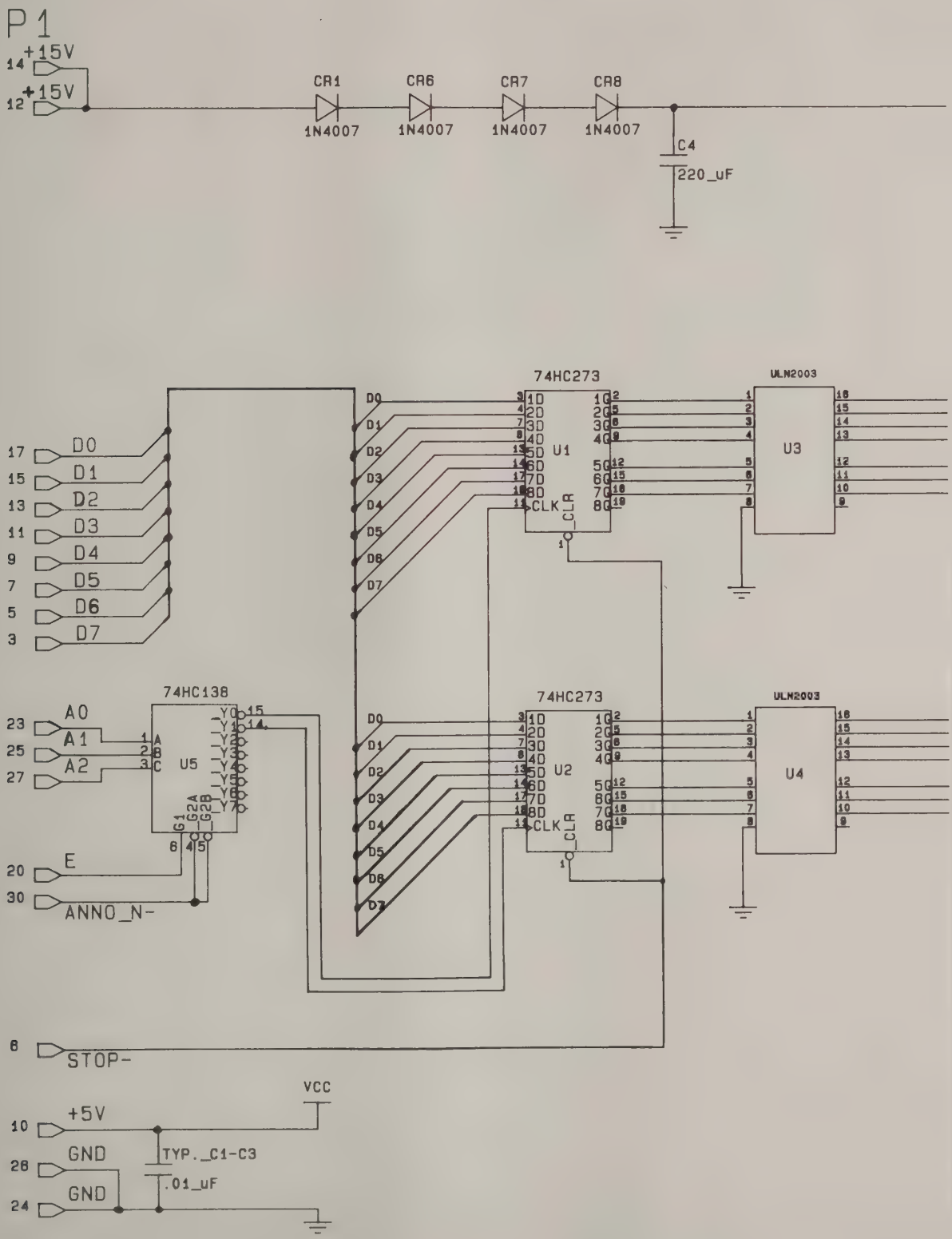
NAME: SCHEMATIC

CODE IDENT: 96795 | ISSUE CODE: G

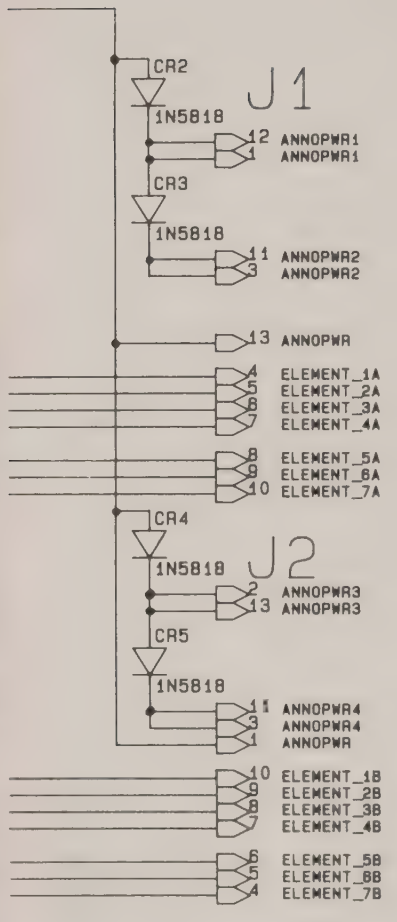
Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.

DWG. NO. 297912

297912


P1
14 +15V
12 +15V
CR1
CR6
CR7
CR8
1N4007
1N4007
1N4007
1N4007
C4
220_uF
74HC273
U1
ULN2003
U3
74HC273
U2
ULN2003
U4
74HC138
U5
17 D0
15 D1
13 D2
11 D3
9 D4
7 D5
5 D6
3 D7
23 A0
25 A1
27 A2
20 E
30 ANNO_N-
6 STOP-
VCC
10 +5V
26 GND
24 GND
TYP._C1-C3
.01_uF

REVISIONS		
SYM	DESCRIPTION	DATE
E	ORIGINAL RELEASE DCN 33755 SWARTZ	12-29-86



DESCRIPTION	DEVICE	+5V	GND
U1, U2	74HC273	20	10
U5	74HC138	16	8

BOARD ASS'Y., INTERCHANNEL ANNOTATION CL-810191

BY	DATE
KRAIZEL	10-86
H. Swartz	12-29-86
KRAIZEL	3/-Dec 86

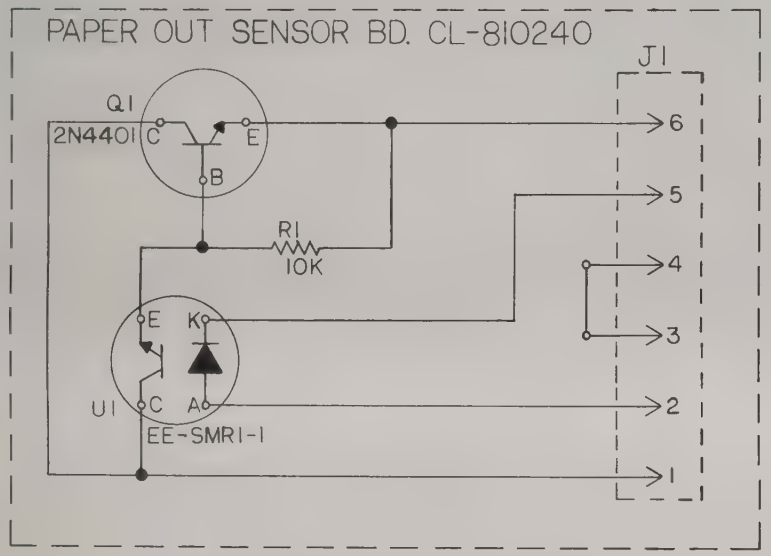
NAME: SCHEMATIC

CODE IDENT: 96795 SIZE: G

Gould Inc
Instruments Division

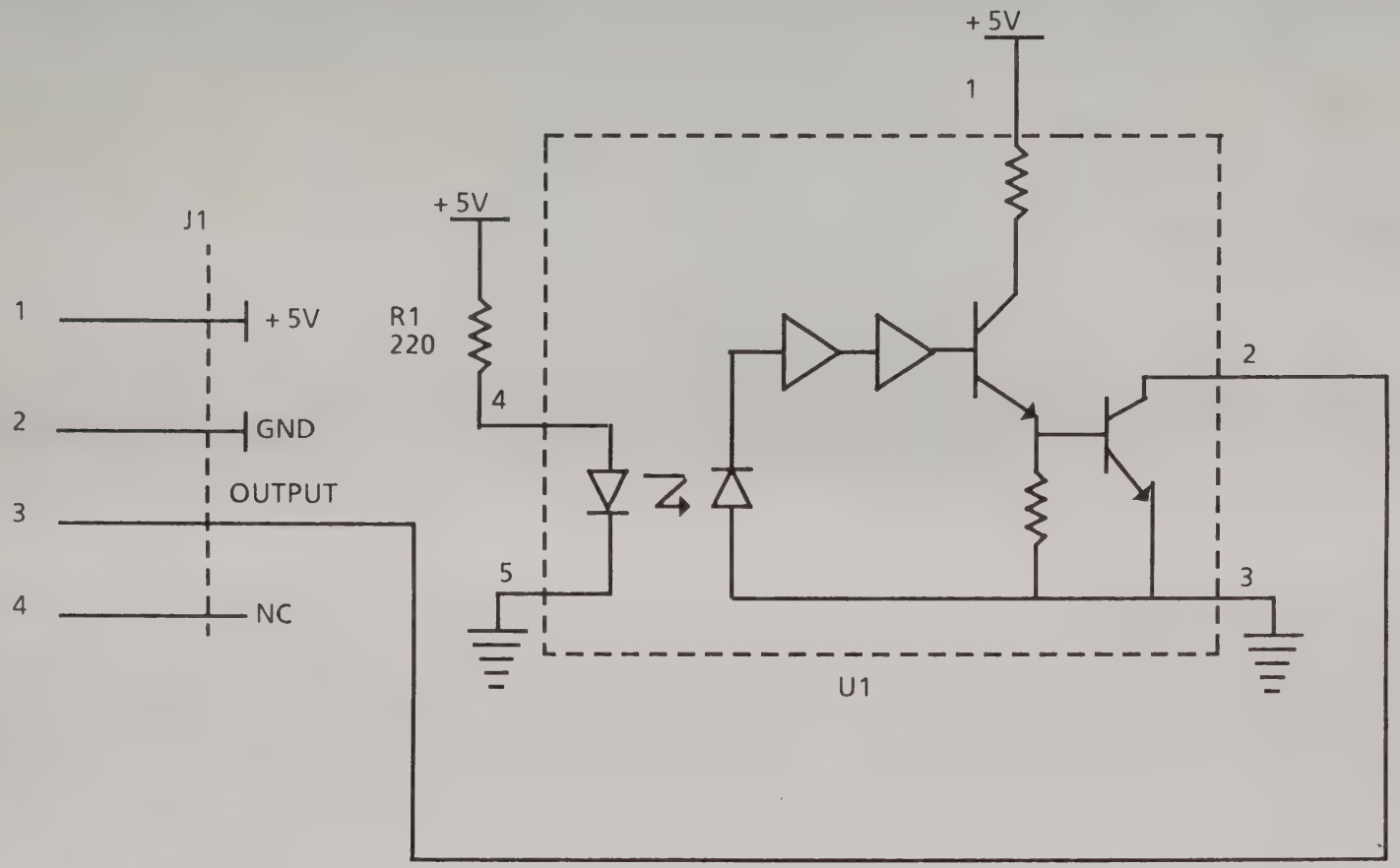
DWG NO: CL-210191

REVISIONS		
SYM	DESCRIPTION	DATE
G	NOT AFFECTED DCN 3936B CLAIR	8-28-87

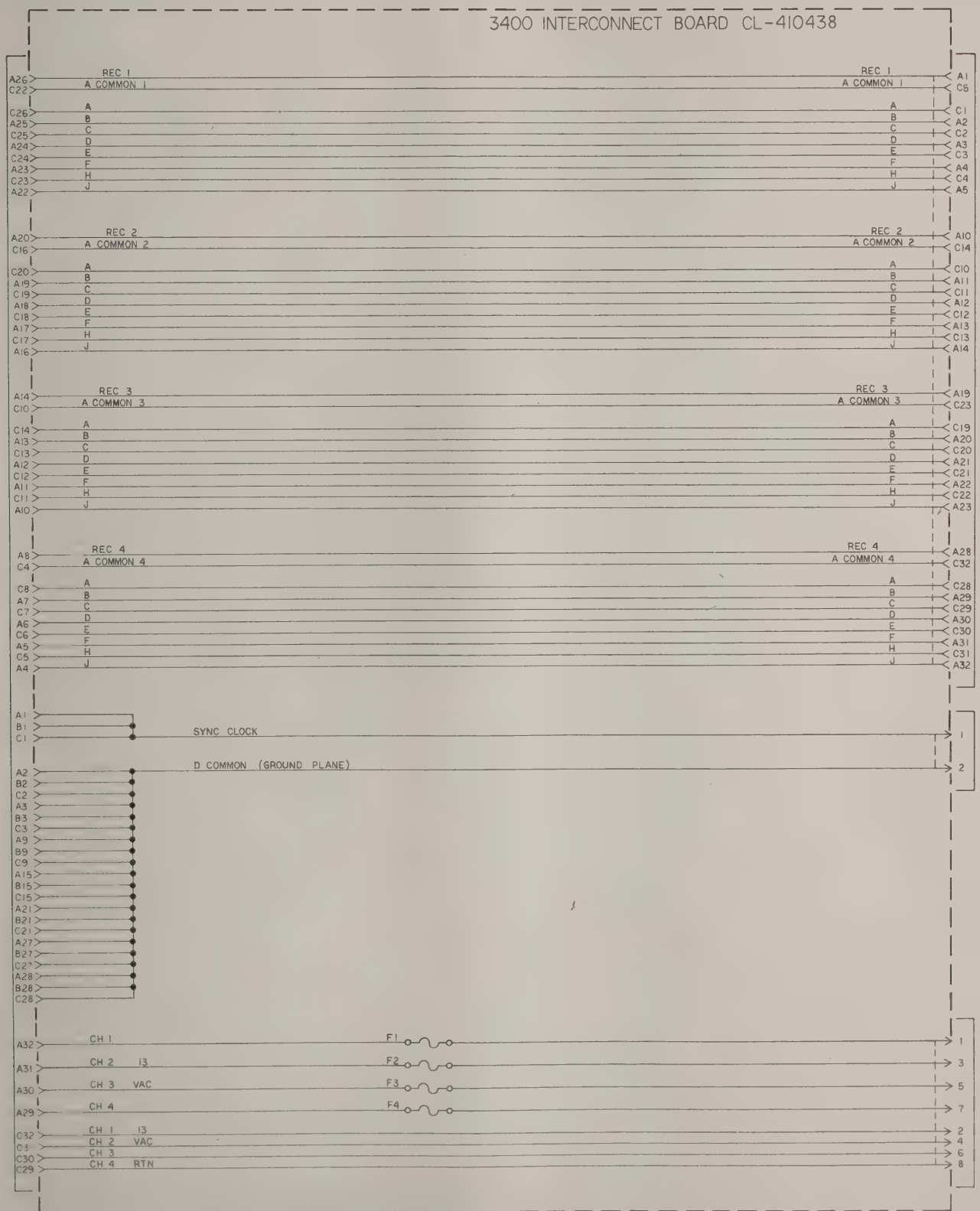


BOARD ASS'Y, PAPER OUT SENSOR CL-810240

BY	DATE	NAME	
DR KOCHIS	9-28-86	SCHEMATIC	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
CH Swartz	11-7-86		DWG. NO. CL-210240
APP		CODE IDENT 96795	ISSUE CODE G



BOARD ASSY., SPEED MONITOR CL-810290

SCHEMATIC DWG. NO. CL-210290

3400 INTERCONNECT BOARD CL-410438
REC 1
A COMMON 1
REC 2
A COMMON 2
REC 3
A COMMON 3
REC 4
A COMMON 4
SYNC CLOCK
D COMMON (GROUND PLANE)
CH 1
CH 2 13
CH 3 VAC
CH 4
CH 1 13
CH 2 VAC
CH 3
CH 4 RTN
F1
F2
F3
F4
J41

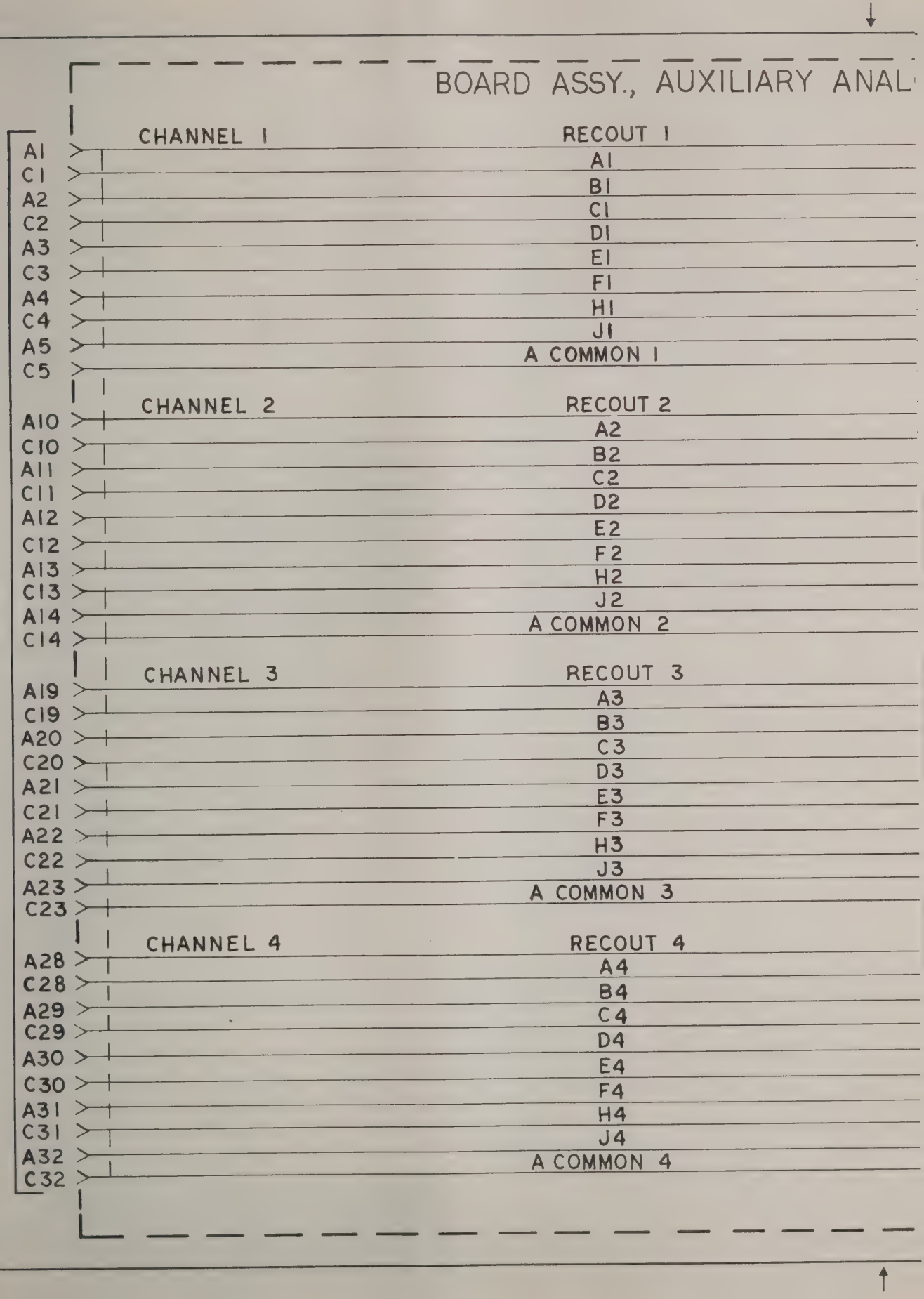
REVISIONS		
SYM	DESCRIPTION	DATE
D	ORIGINAL RELEASE DCN 33723 SWARTZ	12-13 -86

72

>2

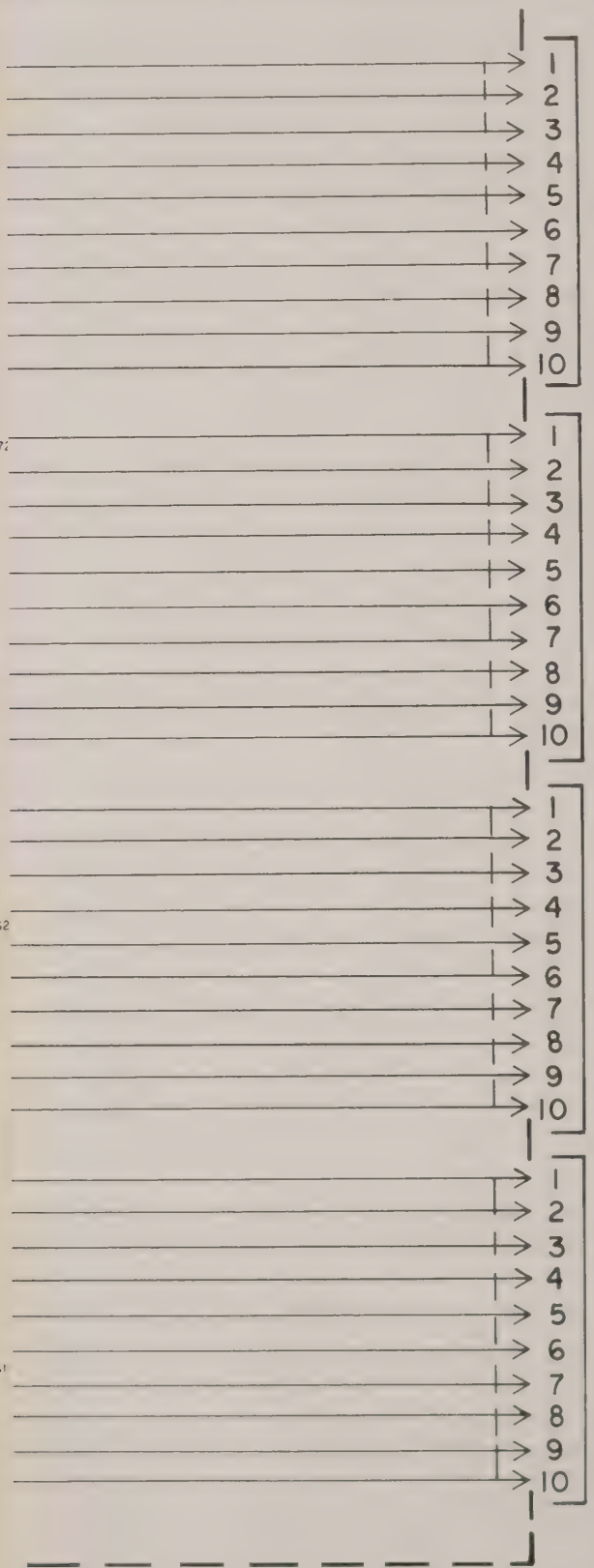
BOARD ASS'Y., INTERCONNECT CL-810438

DR KACHIS 11-86	NAME SCHEMATIC		Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
	CODE IDENT 96795	ISSUE CODE G	DWG. NO. CL-210438


BOARD ASSY., AUXILIARY ANAL
CHANNEL 1
RECOUT 1
A1
C1
A2
C2
A3
C3
A4
C4
A5
C5
A1
B1
C1
D1
E1
F1
H1
J1
A COMMON 1
CHANNEL 2
RECOUT 2
A10
C10
A11
C11
A12
C12
A13
C13
A14
C14
A2
B2
C2
D2
E2
F2
H2
J2
A COMMON 2
CHANNEL 3
RECOUT 3
A19
C19
A20
C20
A21
C21
A22
C22
A23
C23
A3
B3
C3
D3
E3
F3
H3
J3
A COMMON 3
CHANNEL 4
RECOUT 4
A28
C28
A29
C29
A30
C30
A31
C31
A32
C32
A4
B4
C4
D4
E4
F4
H4
J4
A COMMON 4

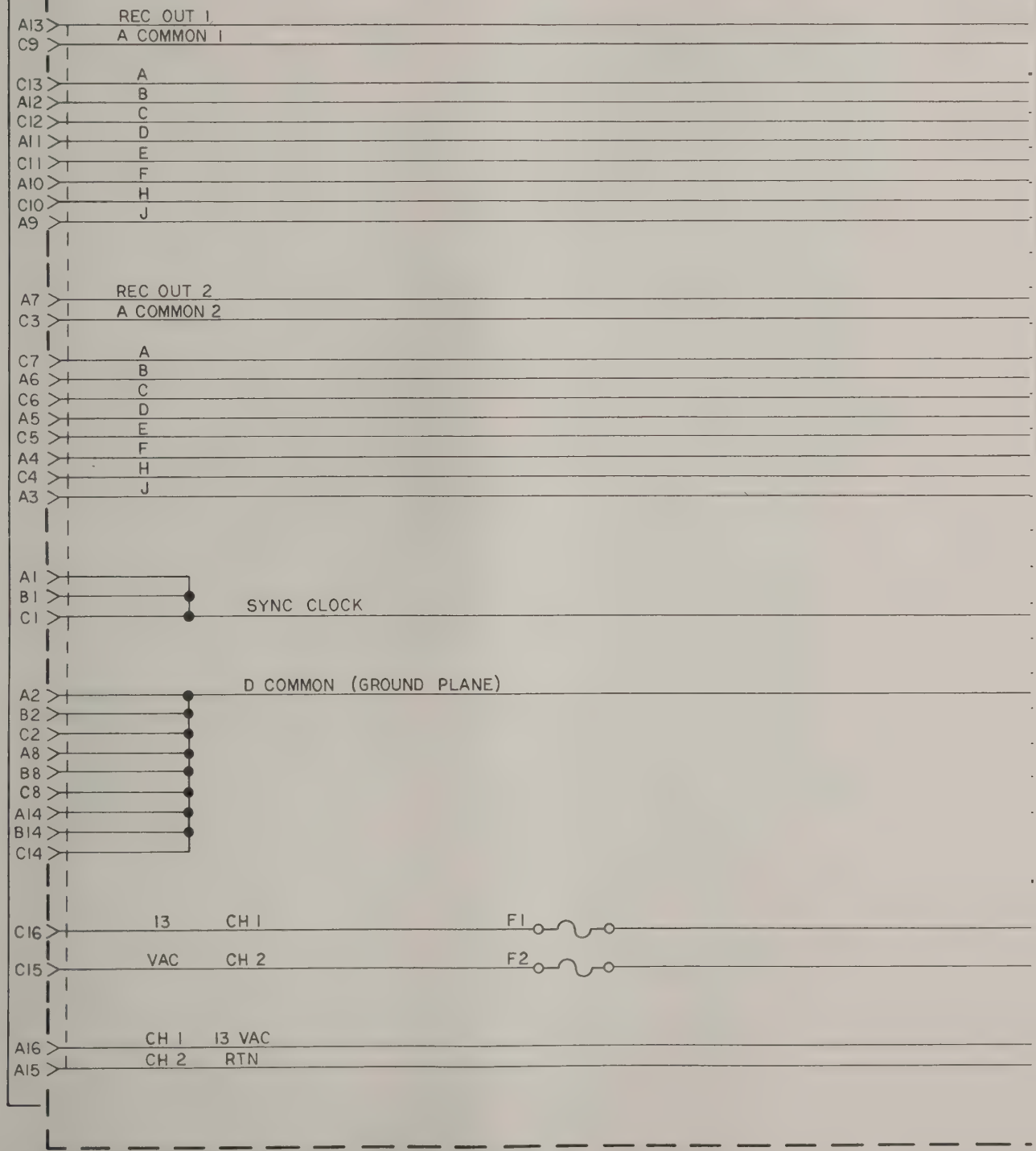
REVISIONS		
SYM	DESCRIPTION	DATE
B	ORIGINAL RELEASE DCN 33604 SWARTZ	11-11-86

OG OUTPUT CL-810439



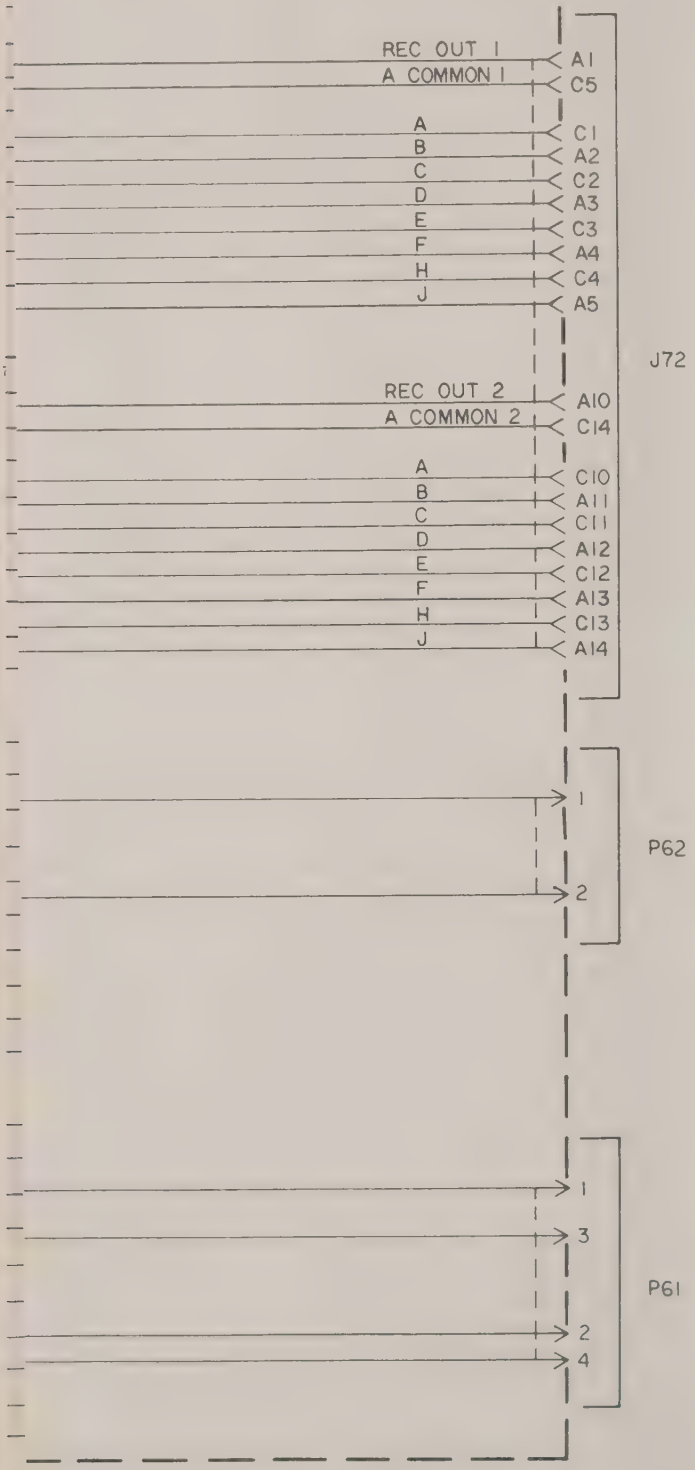
BOARD ASS'Y, AUX. ANALOG OUTPUT CL-810439

C. BRENEMAN 9-11-86	NAME SCHEMATIC	Gould Inc Instruments Division
CM Swartz 11/86		
R. Curtis 11/11/86	CODE IDENT 96795	SIZE CODE G
		DWG NO CL-210439


REC OUT 1
A COMMON 1
A
B
C
D
E
F
H
J
REC OUT 2
A COMMON 2
A
B
C
D
E
F
H
J
J41
SYNC CLOCK
D COMMON (GROUND PLANE)
13 CH 1
VAC CH 2
F1
F2
CH 1 13 VAC
CH 2 RTN

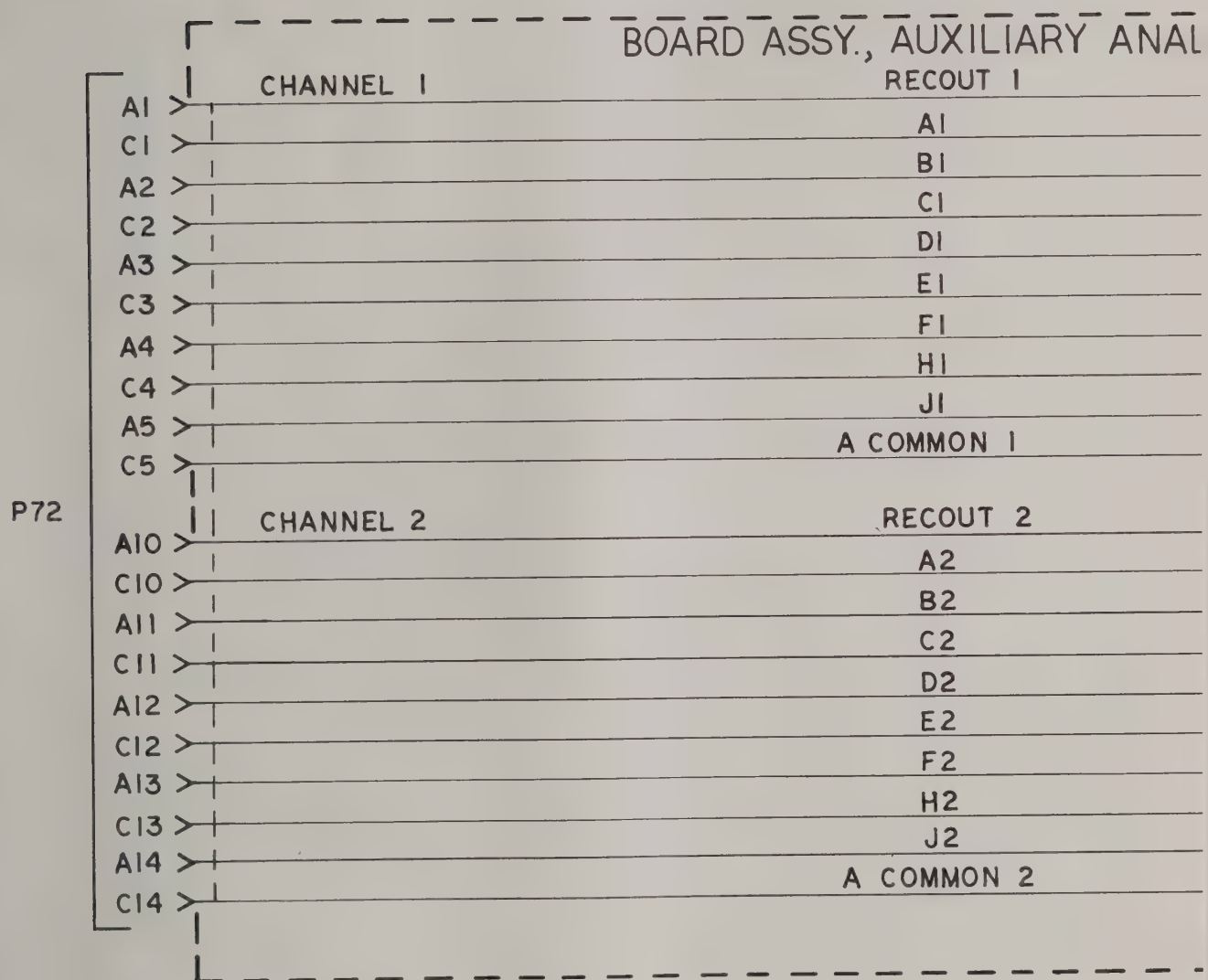
REVISIONS		
SYM	DESCRIPTION	DATE
D	ORIGINAL RELEASE DCN 33726 SWARTZ	12-13-86

ERCONNECT BOARD CL-410461

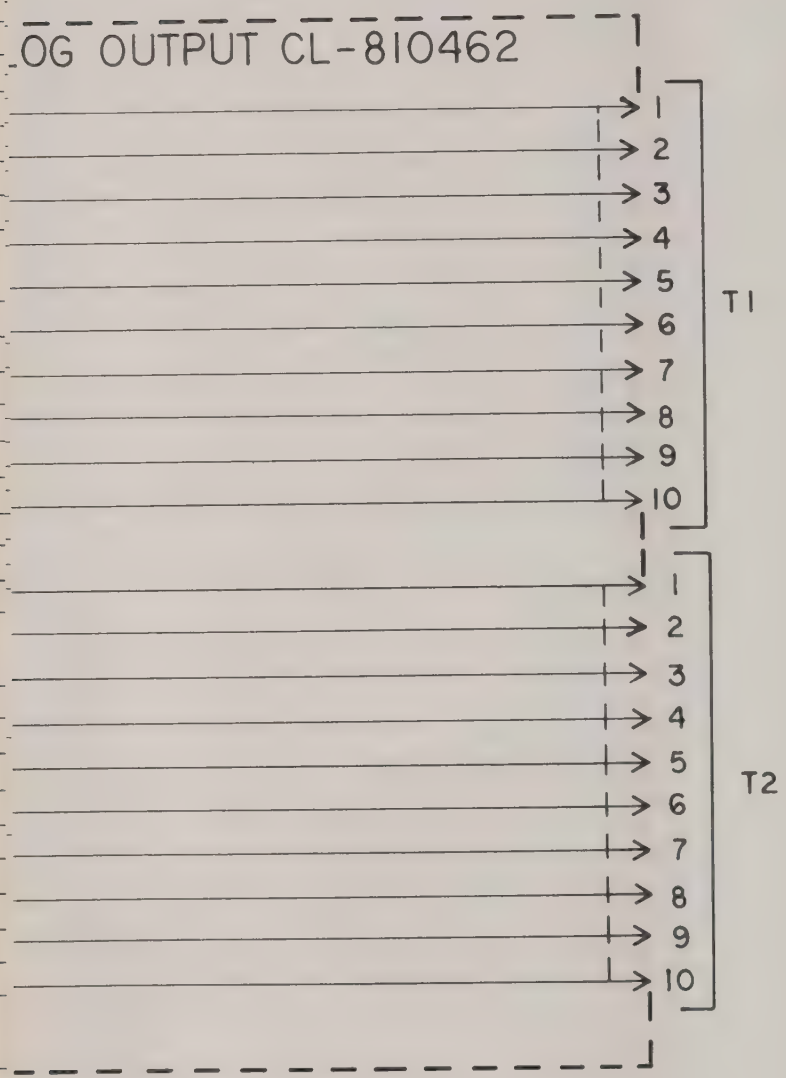


BOARD ASS'Y, INTERCONNECT CL-810461

BY	DATE	NAME	Gould Inc Instruments Division
KOCH IS	1-7-86	SCHEMATIC	
H. Swartz	12-13-86		
R. Custer	12/13/86		
CODE IDENT	96795	ISSUE CODE	G
DWG. NO.	CL-210461		


BOARD ASSY., AUXILIARY ANAL
CHANNEL 1
RECOUT 1
A1
C1
A2
C2
A3
C3
A4
C4
A5
C5
A1
B1
C1
D1
E1
F1
H1
J1
A COMMON 1
P72
CHANNEL 2
RECOUT 2
A10
C10
A11
C11
A12
C12
A13
C13
A14
C14
A2
B2
C2
D2
E2
F2
H2
J2
A COMMON 2

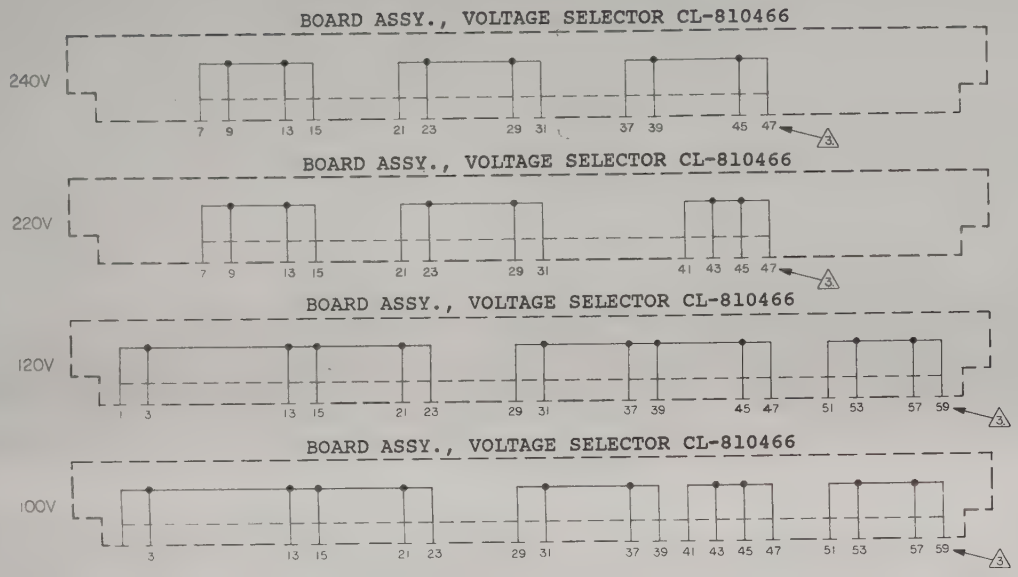
REVISIONS		
SYM	DESCRIPTION	DATE
B	ORIGINAL RELEASE DCN 3360 3 SWALTZ	11-10-[illegible]

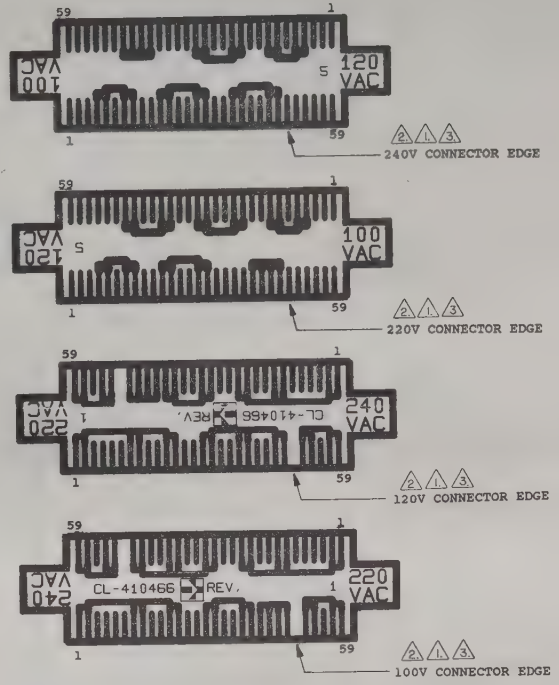


BOARD ASSY, AUX. ANALOG OUTPUT CL-810462

	DATE	NAME	
DR C. DESMENNEY	11-8	SCHEMATIC	Gould Inc Instruments Division Cleveland, Ohio 44114 U.S.A.
CH Swartz	11-8		
APP		CODE IDENT. 96795	DWG NO CL-210462
		ISSUE G	

REVISIONS			
SYM	DESCRIPTION		DATE
D	ORIGINAL RELEASE ISSUE DCN. 34236 J. KOCHIS		5-28-87





3. PIN NUMBERS SHOWN ARE ON THE MATING CONNECTOR AND ARE SHOWN HERE FOR REFERENCE ONLY.

2. SILKSCREEN VOLTAGE NUMBERS (100VAC,120VAC,220VAC,240VAC) CORROSPONDING TO THE CONNECTOR EDGES ARE ON THE REVERSE SIDE OF THE P.C. BOARD.

1. P.C. BOARD SHOWN FOR REFERENCE ONLY.

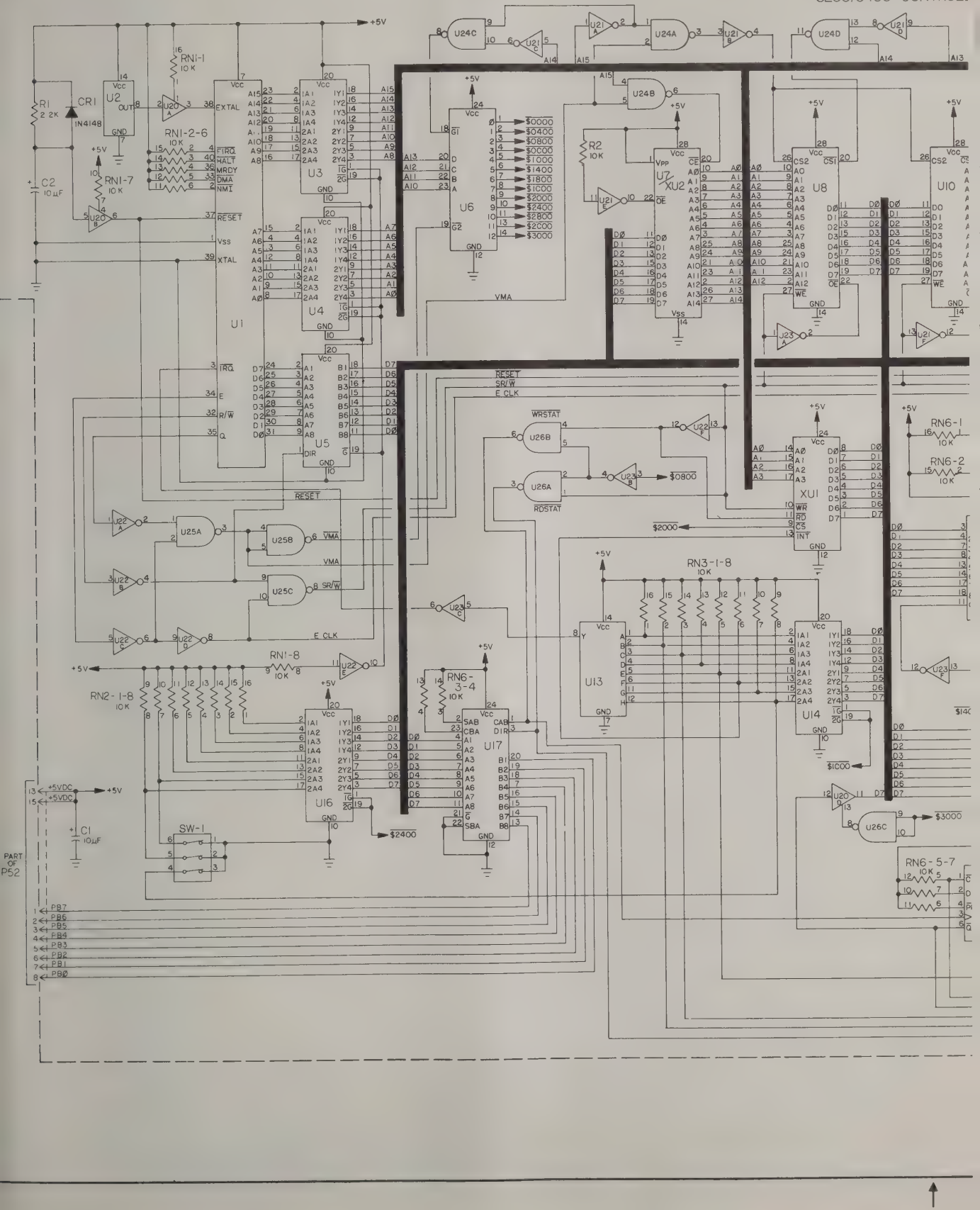
NOTES:

BOARD ASSY.,VOLTAGE SELECTOR CL-810466

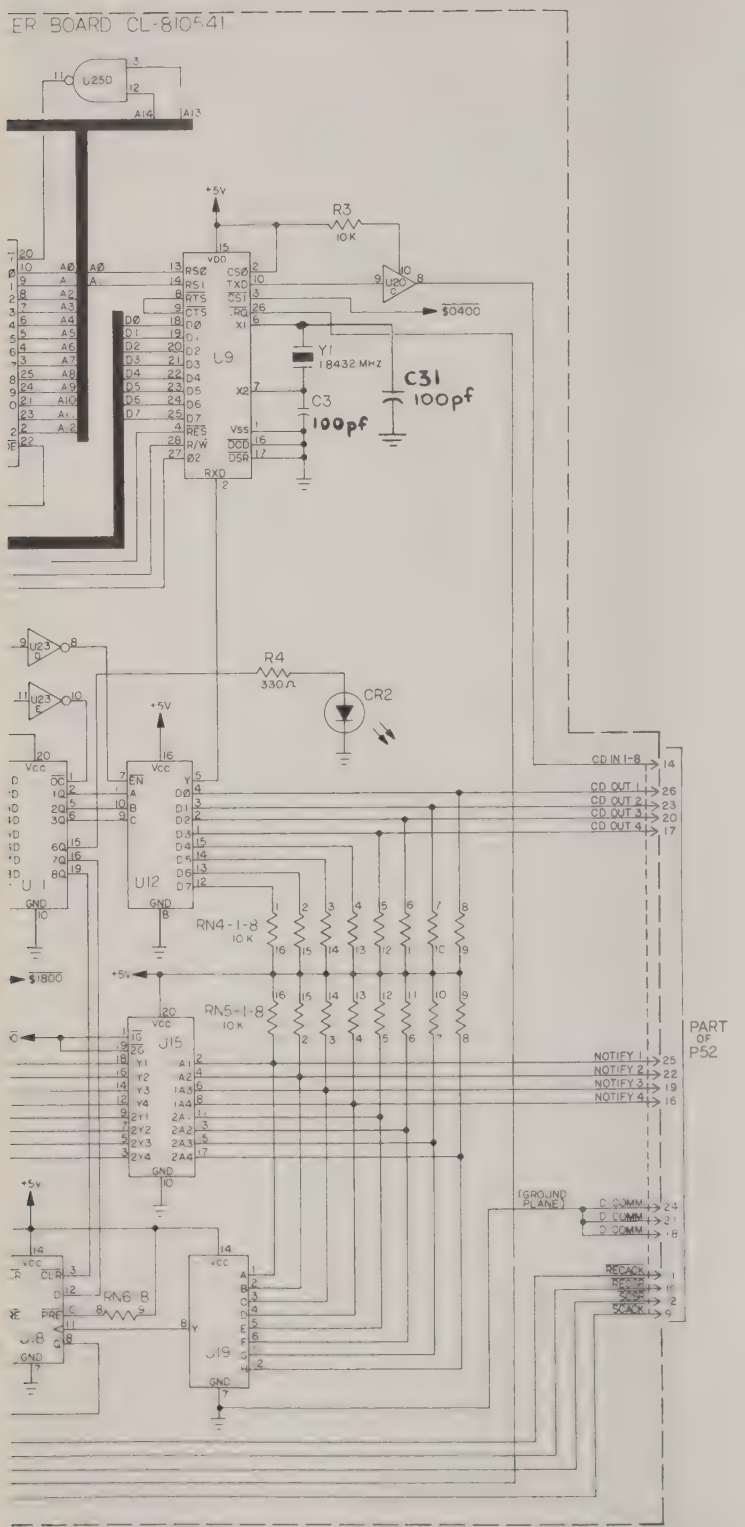
BY	DATE	NAME	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
DR J. KOCHIS	5-27-87	SCHEMATIC	DWG. NO. CL-210466
CH	6-87		
APP	5-27-87		
CODE IDENT. 96795	ISSUE CODE G		

CL-210466

8


+5V
U24C
U24A
U24D
A15
A14
A13
U24B
R1
2.2K
CR1
1N4148
C2
10µF
RN1-1
10K
RN1-2-6
10K
RN1-7
10K
U2
U20
U1
EXTAL
Vss
XTAL
RESET
IRQ
E
R/W
Q
HALT
MRDY
DMA
NMI
U3
U4
U5
U6
U7
XU2
U8
U10
XU1
U13
U14
U16
U17
VMA
RESET
SR/W
E CLK
WRSTAT
RDSTAT
U26B
U26A
U25A
U25B
U25C
$0800
$2000
$2400
$3000
$1400
$1C00
RN3-1-8
10K
RN6-1
10K
RN6-2
10K
RN6-3-4
10K
RN6-5-7
10K
RN1-8
10K
RN2-1-8
10K
SW-1
C1
10µF
+5VDC
PART OF P52
PB7
PB6
PB5
PB4
PB3
PB2
PB1
PB0

REVISIONS		
SYM	DESCRIPTION	DATE
D	ORIGINAL RELEASE DCN 33758 SWARTZ	12-29-86
E	REVISED PER DCN 34223 CLARK	6-8-87



BOARD ASS'Y, CONTROLLER 3200/3400 CL-810541

BY	DATE
DR KOCAIS	12-86
CH	12-29-86
APP Curtis	1/4/87

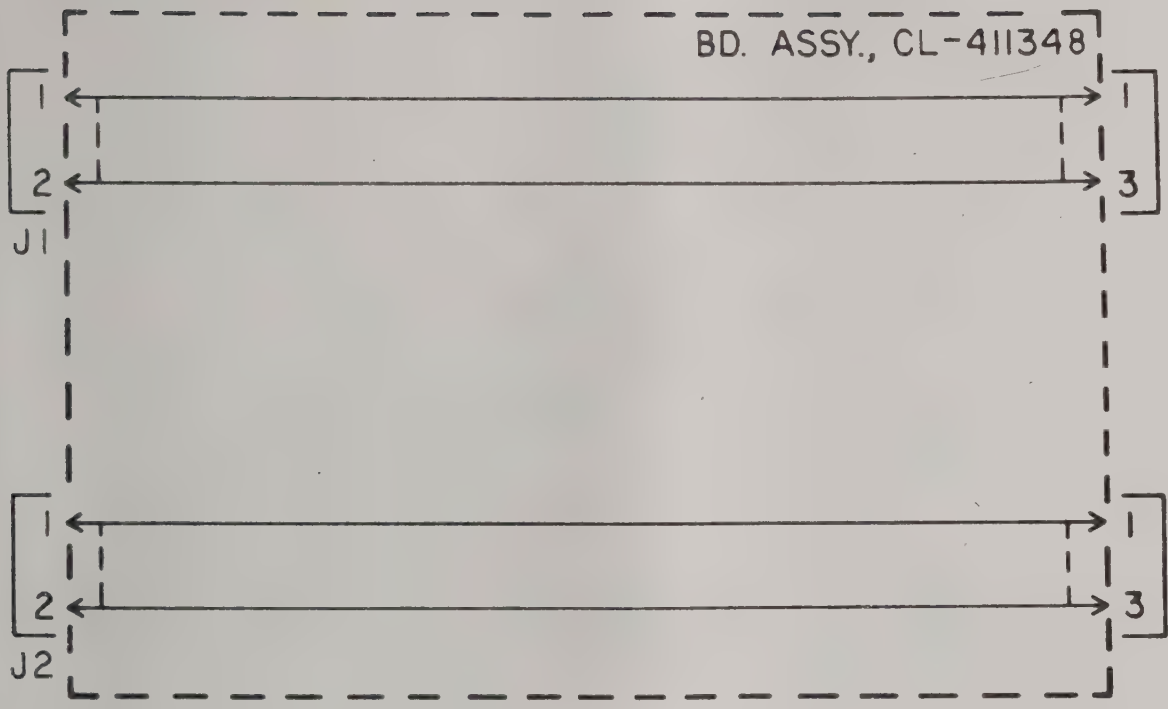
NAME: SCHEMATIC

CODE IDENT. 96795 | ISSUE CODE G

Gould Inc
Instruments Division
Cleveland, Ohio 44114 U.S.A.

DWG NO CL-210541

REVISIONS		
A	ORIGINAL RELEASE ISSUE	2-13-87
B	NOT AFFECTED PER DCN 24048 K. WOODS	3-9-87

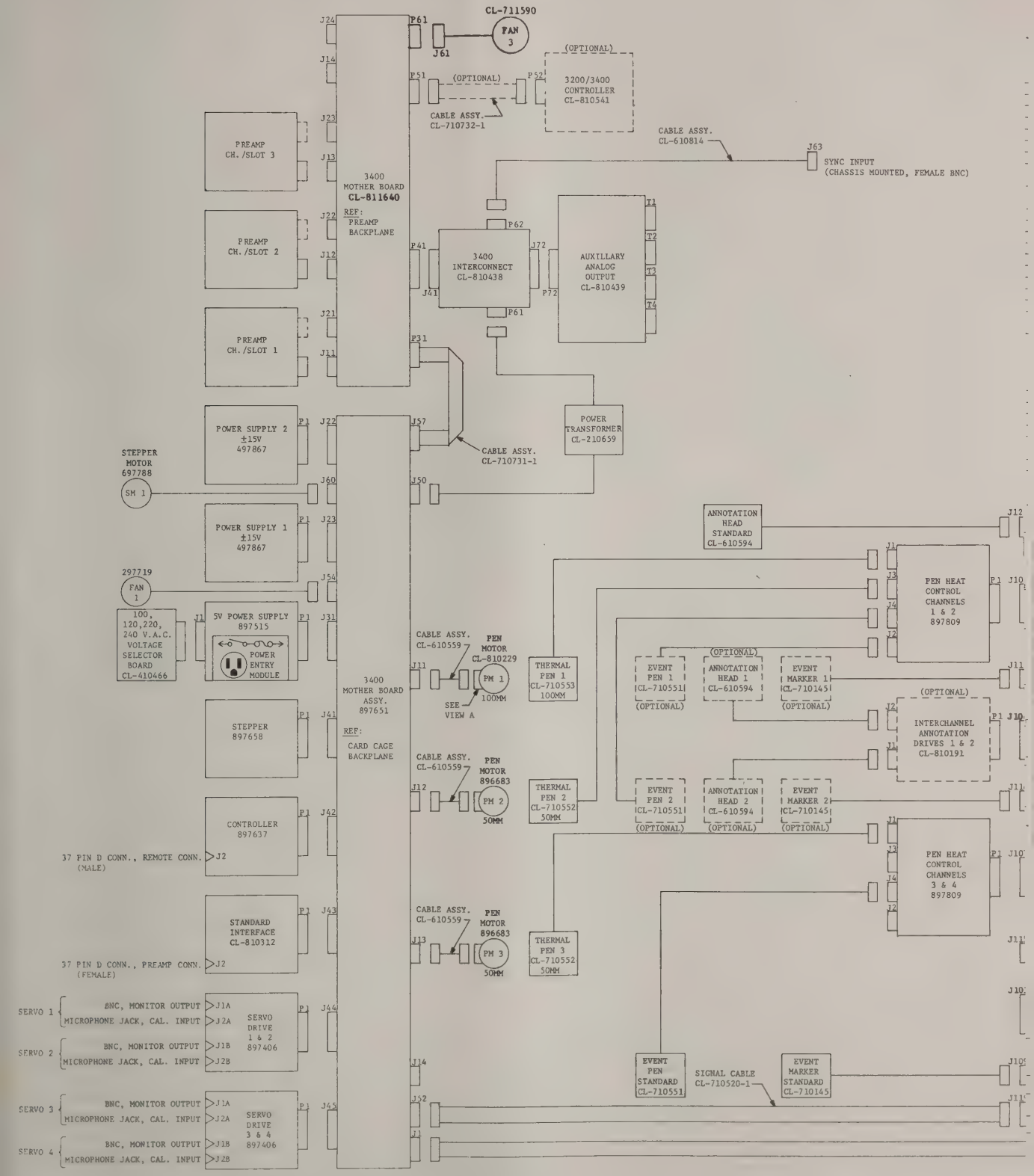


DESIGNATION	PART NUMBER	DESCRIPTION
J1,J2	293983-2	Connector 2 pin
J3,J4	293983-3	Connector 3 pin
	249438-13	Spacer/Standoff
	CL-610876	Modified Strip

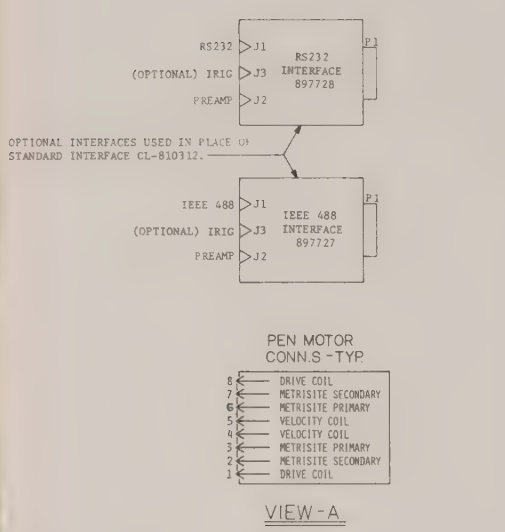
CL-211348

BOARD ASSY., PEN LEAD RETAINER CL-411348

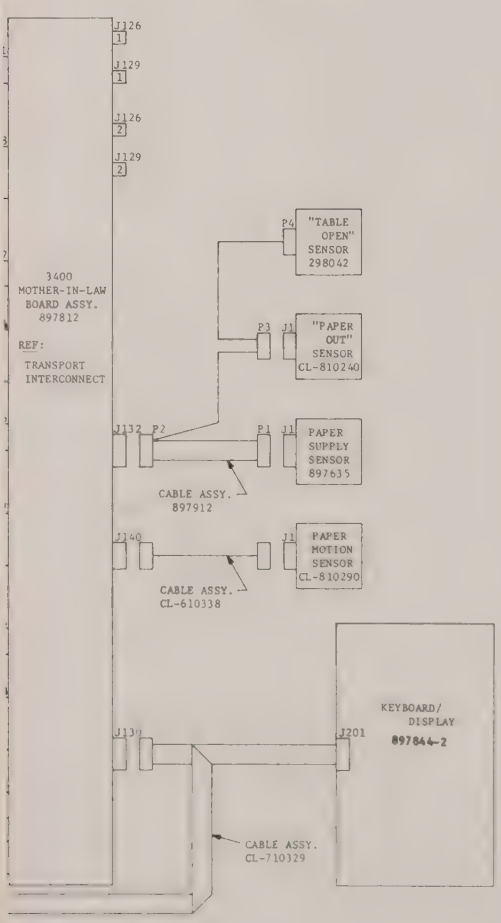
REMOVED 2-6-87	SCHEMATIC	Gould Inc. Instruments Division
	CODE IDENT 96735	CL-211348


CL-711590
FAN 3
(OPTIONAL)
3200/3400 CONTROLLER CL-810541
CABLE ASSY. CL-710732-1
CABLE ASSY. CL-610814
SYNC INPUT (CHASSIS MOUNTED, FEMALE BNC)
PREAMP CH./SLOT 3
PREAMP CH./SLOT 2
PREAMP CH./SLOT 1
3400 MOTHER BOARD CL-811640
REF: PREAMP BACKPLANE
3400 INTERCONNECT CL-810438
AUXILLARY ANALOG OUTPUT CL-810439
POWER SUPPLY 2 ±15V 497867
POWER SUPPLY 1 ±15V 497867
POWER TRANSFORMER CL-210659
CABLE ASSY. CL-710731-1
STEPPER MOTOR 697788
SM 1
297719
FAN 1
100, 120,220, 240 V.A.C. VOLTAGE SELECTOR BOARD CL-410466
5V POWER SUPPLY 897515
POWER ENTRY MODULE
3400 MOTHER BOARD ASSY. 897651
REF: CARD CAGE BACKPLANE
STEPPER 897658
CONTROLLER 897637
37 PIN D CONN., REMOTE CONN. (MALE)
STANDARD INTERFACE CL-810312
37 PIN D CONN., PREAMP CONN. (FEMALE)
CABLE ASSY. CL-610559
PEN MOTOR CL-810229
PM 1
100MM
SEE VIEW A
THERMAL PEN 1 CL-710553 100MM
PEN MOTOR 896683
PM 2
50MM
THERMAL PEN 2 CL-710552 50MM
PM 3
THERMAL PEN 3 CL-710552 50MM
ANNOTATION HEAD STANDARD CL-610594
PEN HEAT CONTROL CHANNELS 1 & 2 897809
EVENT PEN 1 CL-710551
ANNOTATION HEAD 1 CL-610594
EVENT MARKER 1 CL-710145
INTERCHANNEL ANNOTATION DRIVES 1 & 2 CL-810191
EVENT PEN 2 CL-710551
ANNOTATION HEAD 2 CL-610594
EVENT MARKER 2 CL-710145
PEN HEAT CONTROL CHANNELS 3 & 4 897809
EVENT PEN STANDARD CL-710551
SIGNAL CABLE CL-710520-1
EVENT MARKER STANDARD CL-710145
SERVO 1
SERVO 2
SERVO 3
SERVO 4
BNC, MONITOR OUTPUT
MICROPHONE JACK, CAL. INPUT
SERVO DRIVE 1 & 2 897406
SERVO DRIVE 3 & 4 897406

REVISIONS		
SYM	DESCRIPTION	DATE
A-1	CL-711590 WAS: CL-611590	
A-2	CL-811640 WAS: CL-810437 PER DCN. 34140 J. KOCHIS	

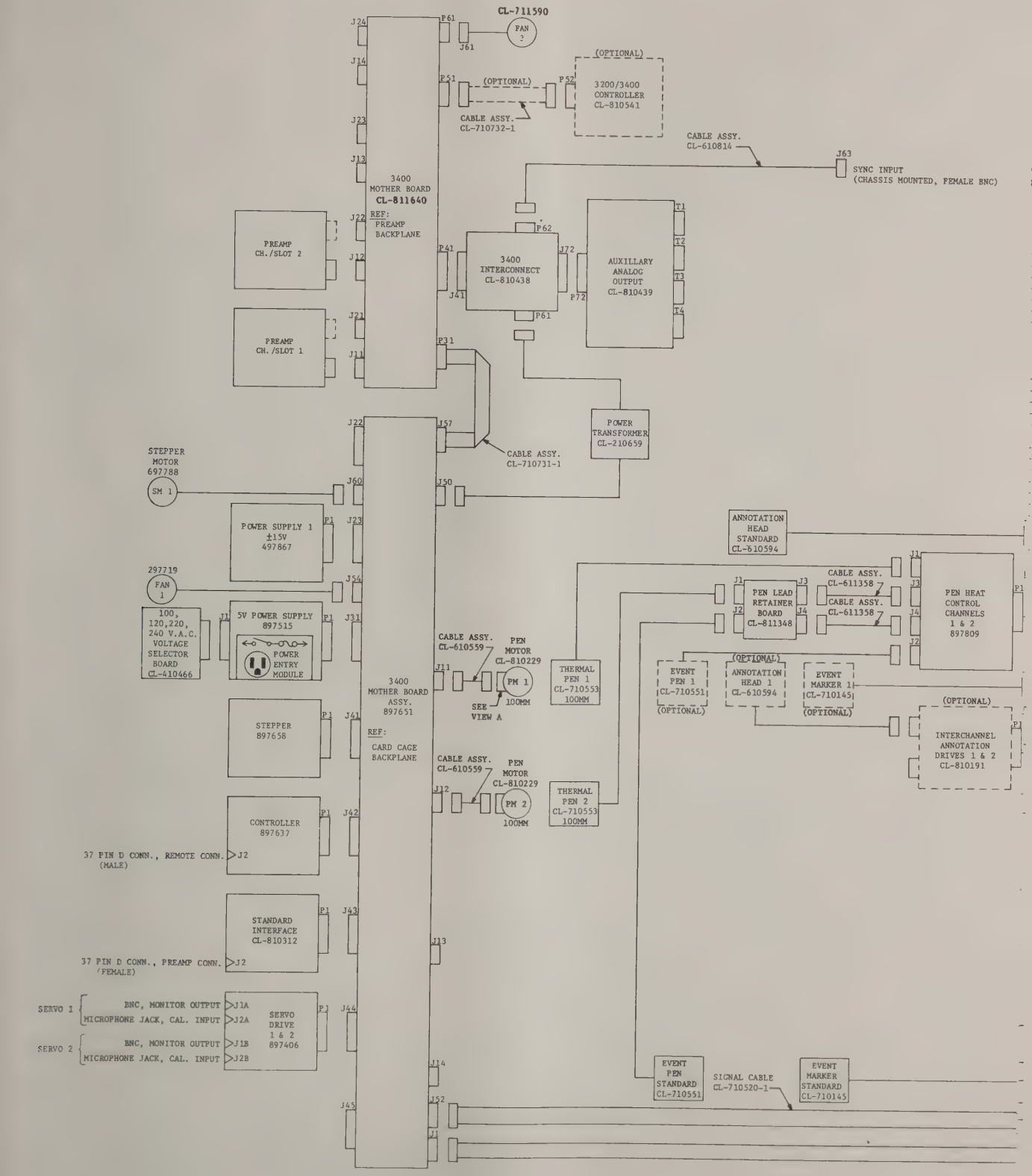


VIEW-A

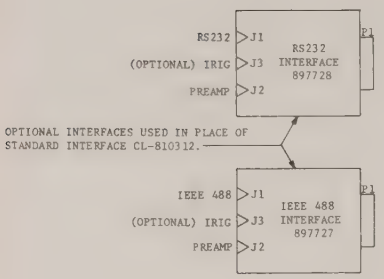


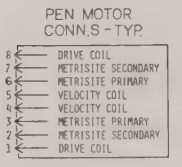
MODEL NO. 30-V8412-00

DR KOCHIS 3-9-87	NAME SCHEMATIC, OVERALL	Gould Inc Instruments Division	
CODE IDENT 96795	SIZE G	DWG NO CL-211532	

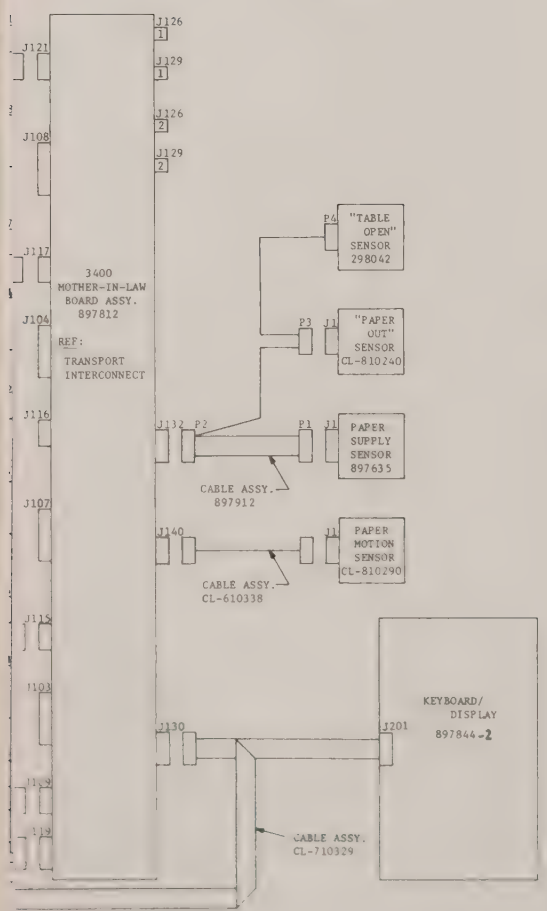

CL-711590
FAN 2
(OPTIONAL)
3200/3400 CONTROLLER CL-810541
CABLE ASSY. CL-710732-1
CABLE ASSY. CL-610814
SYNC INPUT (CHASSIS MOUNTED, FEMALE BNC)
3400 MOTHER BOARD CL-811640
REF: PREAMP BACKPLANE
PREAMP CH./SLOT 2
PREAMP CH./SLOT 1
3400 INTERCONNECT CL-810438
AUXILLARY ANALOG OUTPUT CL-810439
POWER TRANSFORMER CL-210659
CABLE ASSY. CL-710731-1
STEPPER MOTOR 697788
SM 1
POWER SUPPLY 1 ±15V 497867
297719 FAN 1
100, 120,220, 240 V.A.C. VOLTAGE SELECTOR BOARD CL-410466
5V POWER SUPPLY 897515
POWER ENTRY MODULE
3400 MOTHER BOARD ASSY. 897651
REF: CARD CAGE BACKPLANE
STEPPER 897658
CONTROLLER 897637
37 PIN D CONN., REMOTE CONN. (MALE)
STANDARD INTERFACE CL-810312
37 PIN D CONN., PREAMP CONN. (FEMALE)
SERVO 1
SERVO 2
BNC, MONITOR OUTPUT
MICROPHONE JACK, CAL. INPUT
SERVO DRIVE 1 & 2 897406
CABLE ASSY. CL-610559
PEN MOTOR CL-810229
PM 1
PM 2
100MM
SEE VIEW A
THERMAL PEN 1 CL-710553 100MM
THERMAL PEN 2 CL-710553 100MM
ANNOTATION HEAD STANDARD CL-610594
PEN LEAD RETAINER BOARD CL-811348
CABLE ASSY. CL-611358
PEN HEAT CONTROL CHANNELS 1 & 2 897809
(OPTIONAL)
EVENT PEN 1 CL-710551
ANNOTATION HEAD 1 CL-610594
EVENT MARKER 1 CL-710145
INTERCHANNEL ANNOTATION DRIVES 1 & 2 CL-810191
EVENT PEN STANDARD CL-710551
SIGNAL CABLE CL-710520-1
EVENT MARKER STANDARD CL-710145

REVISIONS		
SYM	DESCRIPTION	DATE
A-1	CL-711590 WAS: CL-611590	
A-2	CL-811640 WAS: CL-810437 PER DCN. 34140 J. KOCHIS	MF





VIEW - A



MODEL NO. 30-V8420-00

BY	DATE
KOCHIS	3-9-87
	4/27
	7/87

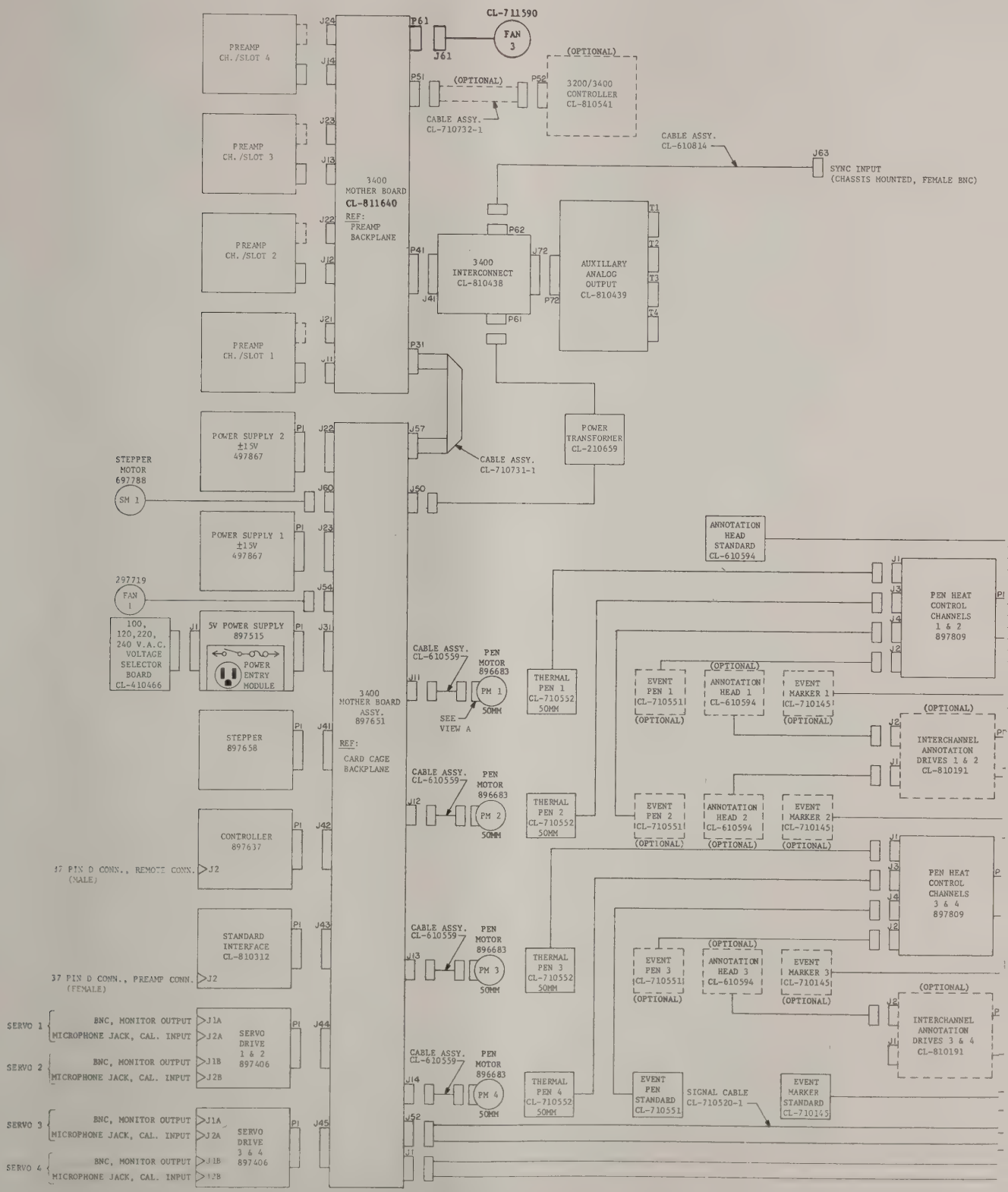
NAME: SCHEMATIC OVERALL

CODE IDENT. 96795 | ISSUE G

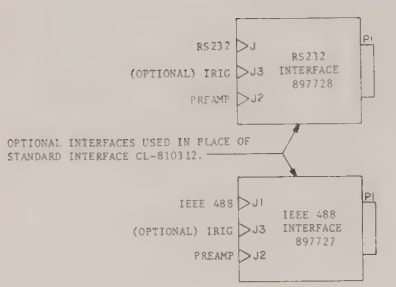
Gould Inc
Instruments Division
44114 U.S.A.

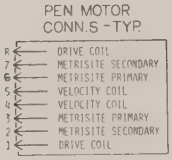
DWG NO. CL-211534

CL-211534

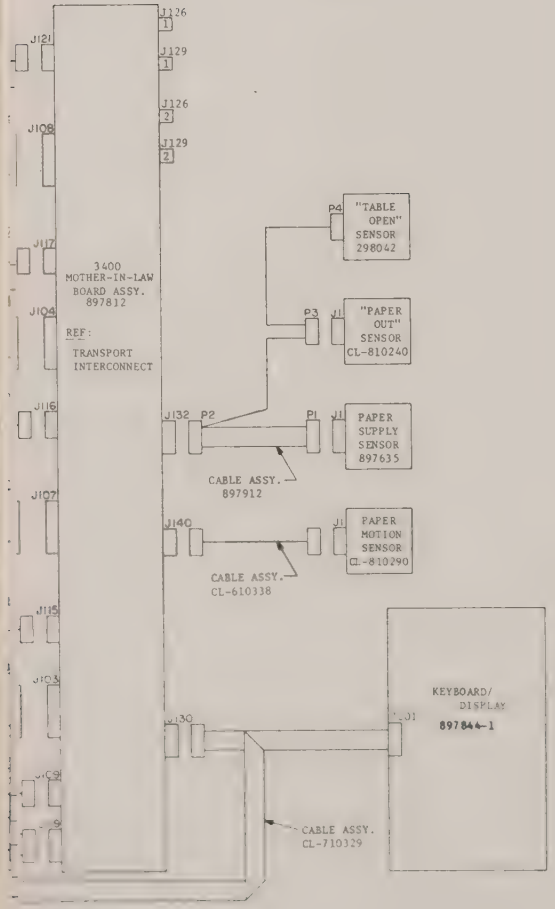

CL-711590
FAN 3
PREAMP CH./SLOT 4
PREAMP CH./SLOT 3
PREAMP CH./SLOT 2
PREAMP CH./SLOT 1
3400 MOTHER BOARD CL-811640
REF: PREAMP BACKPLANE
(OPTIONAL)
3200/3400 CONTROLLER CL-810541
CABLE ASSY. CL-710732-1
CABLE ASSY. CL-610814
SYNC INPUT (CHASSIS MOUNTED, FEMALE BNC)
3400 INTERCONNECT CL-810438
AUXILLARY ANALOG OUTPUT CL-810439
POWER SUPPLY 2 ±15V 497867
POWER SUPPLY 1 ±15V 497867
POWER TRANSFORMER CL-210659
CABLE ASSY. CL-710731-1
STEPPER MOTOR 697788
SM 1
297719
FAN 1
100, 120, 220, 240 V.A.C. VOLTAGE SELECTOR BOARD CL-410466
5V POWER SUPPLY 897515
POWER ENTRY MODULE
3400 MOTHER BOARD ASSY. 897651
REF: CARD CAGE BACKPLANE
STEPPER 897658
CONTROLLER 897637
37 PIN D CONN., REMOTE CONN. (MALE)
STANDARD INTERFACE CL-810312
37 PIN D CONN., PREAMP CONN. (FEMALE)
SERVO 1
SERVO 2
SERVO 3
SERVO 4
BNC, MONITOR OUTPUT
MICROPHONE JACK, CAL. INPUT
SERVO DRIVE 1 & 2 897406
SERVO DRIVE 3 & 4 897406
CABLE ASSY. CL-610559
PEN MOTOR 896683
PM 1
PM 2
PM 3
PM 4
50MM
SEE VIEW A
THERMAL PEN 1 CL-710552 50MM
THERMAL PEN 2 CL-710552 50MM
THERMAL PEN 3 CL-710552 50MM
THERMAL PEN 4 CL-710552 50MM
ANNOTATION HEAD STANDARD CL-610594
PEN HEAT CONTROL CHANNELS 1 & 2 897809
PEN HEAT CONTROL CHANNELS 3 & 4 897809
EVENT PEN 1 CL-710551
ANNOTATION HEAD 1 CL-610594
EVENT MARKER 1 CL-710145
INTERCHANNEL ANNOTATION DRIVES 1 & 2 CL-810191
EVENT PEN 2 CL-710551
ANNOTATION HEAD 2 CL-610594
EVENT MARKER 2 CL-710145
EVENT PEN 3 CL-710551
ANNOTATION HEAD 3 CL-610594
EVENT MARKER 3 CL-710145
INTERCHANNEL ANNOTATION DRIVES 3 & 4 CL-810191
EVENT PEN STANDARD CL-710551
SIGNAL CABLE CL-710520-1
EVENT MARKER STANDARD CL-710145
(OPTIONAL)

REVISIONS		
SYM	DESCRIPTION	DATE
A-1	CL-711590 WAS: CL-611590	
A-2	CL-811640 WAS: CL-810437 PER DCN. 34140 J. KOCHIS	





VIEW-A



MODEL NO. 30-V8404-00

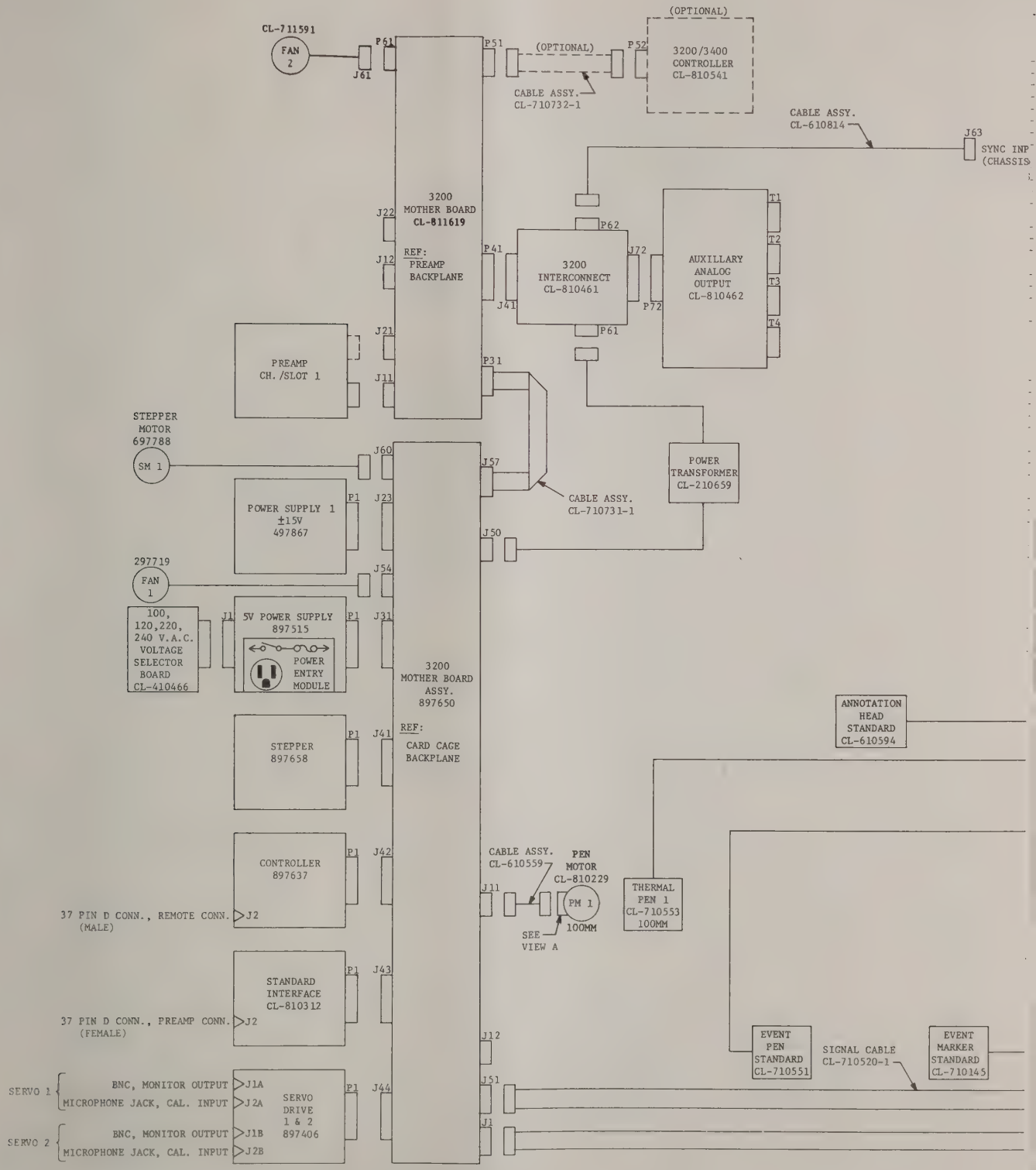
BY	DATE
DR KOCHIS	3-9-87
	4/6/87

NAME SCHEMATIC, OVERALL

CODE IDENT 96795 | ISSUE G

Gould Inc
Instruments Division
[illegible] 44114 U.S.A.

DWG NO CL-211536


CL-711591
FAN 2
J61
P61
P51
(OPTIONAL)
P52
3200/3400 CONTROLLER CL-810541
CABLE ASSY. CL-710732-1
CABLE ASSY. CL-610814
J63
SYNC INP (CHASSIS
3200 MOTHER BOARD CL-811619
J22
J12
REF: PREAMP BACKPLANE
P62
P41
3200 INTERCONNECT CL-810461
J72
J41
P72
P61
AUXILLARY ANALOG OUTPUT CL-810462
T1
T2
T3
T4
J21
J11
PREAMP CH./SLOT 1
P31
STEPPER MOTOR 697788
SM 1
J60
J57
CABLE ASSY. CL-710731-1
POWER TRANSFORMER CL-210659
POWER SUPPLY 1 ±15V 497867
P1
J23
J50
297719
FAN 1
J54
100, 120,220, 240 V.A.C. VOLTAGE SELECTOR BOARD CL-410466
J1
5V POWER SUPPLY 897515
POWER ENTRY MODULE
P1
J31
3200 MOTHER BOARD ASSY. 897650
REF: CARD CAGE BACKPLANE
STEPPER 897658
P1
J41
ANNOTATION HEAD STANDARD CL-610594
CONTROLLER 897637
P1
J42
CABLE ASSY. CL-610559
PEN MOTOR CL-810229
J11
PM 1
100MM
SEE VIEW A
THERMAL PEN 1 CL-710553 100MM
37 PIN D CONN., REMOTE CONN. (MALE)
J2
STANDARD INTERFACE CL-810312
P1
J43
37 PIN D CONN., PREAMP CONN. (FEMALE)
J2
J12
EVENT PEN STANDARD CL-710551
SIGNAL CABLE CL-710520-1
EVENT MARKER STANDARD CL-710145
J51
J1
SERVO 1
BNC, MONITOR OUTPUT
J1A
MICROPHONE JACK, CAL. INPUT
J2A
SERVO 2
BNC, MONITOR OUTPUT
J1B
MICROPHONE JACK, CAL. INPUT
J2B
SERVO DRIVE 1 & 2 897406
P1
J44

REVISIONS		
SYM	DESCRIPTION	DATE
A-1	CL-711591 WAS: CL-611591	
A-2	CL-811619 WAS: CL-810460 PER DCN. 34140 J. KOCHIS	

M1

UT
MOUNTED, FEMALE BNC)

RS232 J1
(OPTIONAL) IRIG J3
PREAMP J2
RS232 INTERFACE 897728
P1

OPTIONAL INTERFACES USED IN PLACE OF STANDARD INTERFACE CL-810312.

IEEE 488 J1
(OPTIONAL) IRIG J3
PREAMP J2
IEEE 488 INTERFACE 897727
P1

PEN MOTOR CONN.S - TYP.

8	DRIVE COIL
7	METRISITE SECONDARY
6	METRISITE PRIMARY
5	VELOCITY COIL
4	VELOCITY COIL
3	METRISITE PRIMARY
2	METRISITE SECONDARY
1	DRIVE COIL

VIEW-A

J126 2
J129 2
J126 1
J129 1
3200 MOTHER-IN-LAW BOARD ASSY. 897811
REF: TRANSPORT INTERCONNECT
J121
J1
PEN HEAT CONTROL CHANNELS 1 & 2 897809
J3
J4
J2
P1
J108
J117
J104
J109
J120

P4 "TABLE OPEN" SENSOR 298042
P3 J1 "PAPER OUT" SENSOR CL-810240
J132 P2 P1 J1 PAPER SUPPLY SENSOR 897635
CABLE ASSY. 897912
J140 J1 PAPER MOTION SENSOR CL-810290
CABLE ASSY. CL-610338

KEYBOARD/ DISPLAY 897843-2
J130 J201
CABLE ASSY. CL-710329

MODEL NO. 30-V8210-00

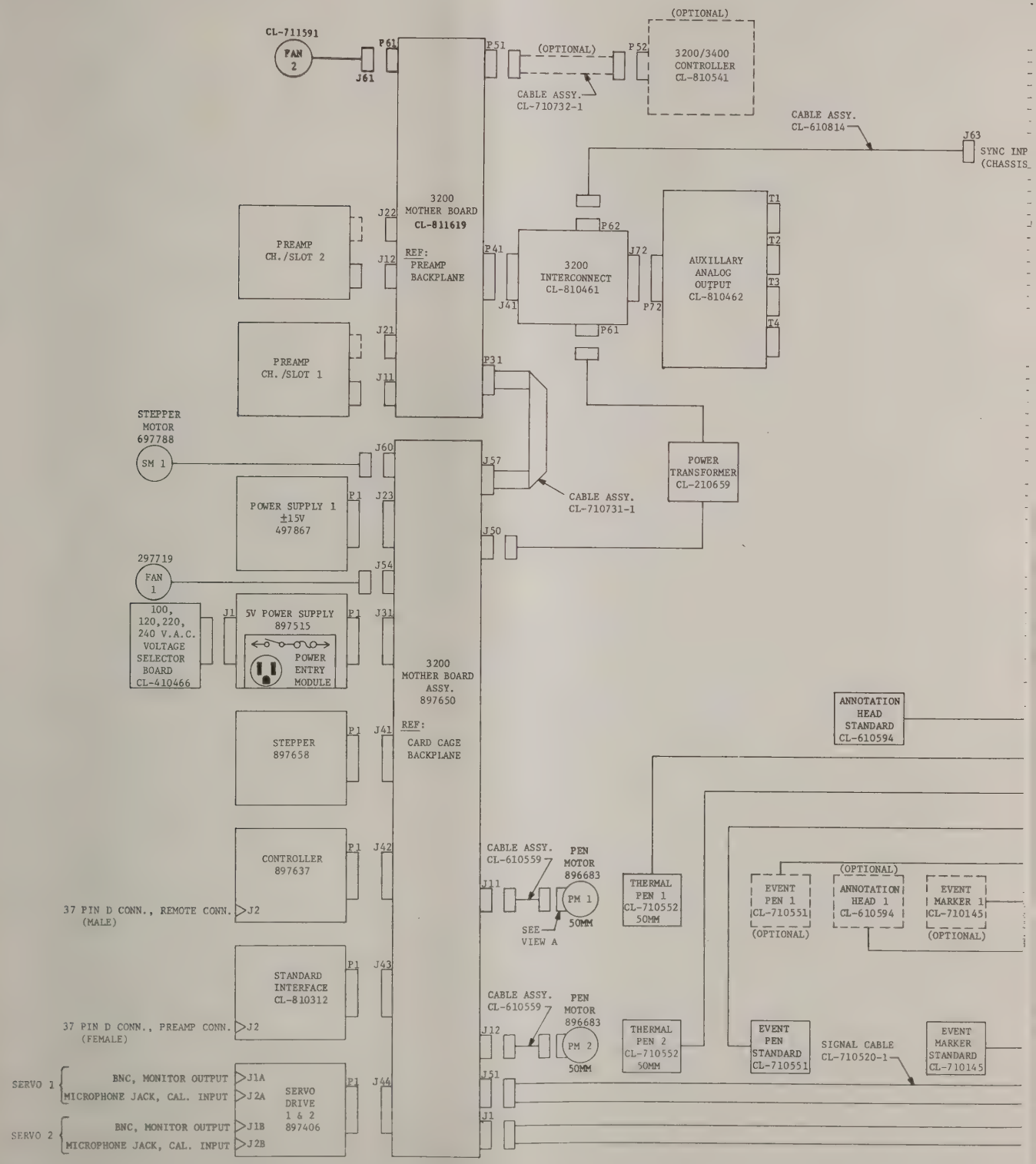
BY	DATE
CH KOCHIS	3-5-87
M Dwyer	4/8/87
A J.D	4/8/87

NAME SCHEMATIC, OVERALL

CODE IDENT 96795 SIZE G

Gould Inc
Instruments Division
Roseland, New Jersey 07068 U.S.A.
DWG NO CL-211538

M1-211538


CL-711591
FAN 2
J61
P61
3200 MOTHER BOARD CL-811619
REF: PREAMP BACKPLANE
J22
J12
PREAMP CH./SLOT 2
J21
J11
PREAMP CH./SLOT 1
P51
(OPTIONAL)
P52
3200/3400 CONTROLLER CL-810541
CABLE ASSY. CL-710732-1
CABLE ASSY. CL-610814
J63
SYNC INP (CHASSIS
P41
J41
3200 INTERCONNECT CL-810461
P62
P61
J72
P72
AUXILLARY ANALOG OUTPUT CL-810462
T1
T2
T3
T4
P31
STEPPER MOTOR 697788
SM 1
J60
POWER SUPPLY 1 ±15V 497867
P1
J23
J57
J50
CABLE ASSY. CL-710731-1
POWER TRANSFORMER CL-210659
297719
FAN 1
J54
100, 120, 220, 240 V.A.C. VOLTAGE SELECTOR BOARD CL-410466
J1
5V POWER SUPPLY 897515
P1
J31
POWER ENTRY MODULE
3200 MOTHER BOARD ASSY. 897650
REF: CARD CAGE BACKPLANE
STEPPER 897658
P1
J41
ANNOTATION HEAD STANDARD CL-610594
CONTROLLER 897637
P1
J42
37 PIN D CONN., REMOTE CONN. (MALE)
J2
CABLE ASSY. CL-610559
PEN MOTOR 896683
J11
PM 1
50MM
SEE VIEW A
THERMAL PEN 1 CL-710552 50MM
(OPTIONAL)
EVENT PEN 1 CL-710551
(OPTIONAL)
ANNOTATION HEAD 1 CL-610594
EVENT MARKER 1 CL-710145
(OPTIONAL)
STANDARD INTERFACE CL-810312
P1
J43
37 PIN D CONN., PREAMP CONN. (FEMALE)
J2
CABLE ASSY. CL-610559
PEN MOTOR 896683
J12
PM 2
50MM
THERMAL PEN 2 CL-710552 50MM
EVENT PEN STANDARD CL-710551
SIGNAL CABLE CL-710520-1
EVENT MARKER STANDARD CL-710145
SERVO 1
BNC, MONITOR OUTPUT
J1A
MICROPHONE JACK, CAL. INPUT
J2A
SERVO 2
BNC, MONITOR OUTPUT
J1B
MICROPHONE JACK, CAL. INPUT
J2B
SERVO DRIVE 1 & 2 897406
P1
J44
J51
J1

REVISIONS		
SYM	DESCRIPTION	DATE
A-1	CL-711591 WAS: CL-611591	
A-2	CL-811619 WAS: CL-810460 PER DCN. 34140 J. KOCHIS	M F

UT
MOUNTED, FEMALE BNC)

RS232 J1
(OPTIONAL) IRIG J3
PREAMP J2
RS232 INTERFACE 897728
P1

OPTIONAL INTERFACES USED IN PLACE OF STANDARD INTERFACE CL-810312.

IEEE 488 J1
(OPTIONAL) IRIG J3
PREAMP J2
IEEE 488 INTERFACE 897727
P1

PEN MOTOR CONN.S - TYP.

8	DRIVE COIL
7	METRISITE SECONDARY
6	METRISITE PRIMARY
5	VELOCITY COIL
4	VELOCITY COIL
3	METRISITE PRIMARY
2	METRISITE SECONDARY
1	DRIVE COIL

VIEW-A

J126 2
J129 2
J126 1
J129 1
3200 MOTHER-IN-LAW BOARD ASSY. 897811
REF: TRANSPORT INTERCONNECT
J121

P4 "TABLE OPEN" SENSOR 298042
P3 J1 "PAPER OUT" SENSOR CL-810240
J132 P2 P1 J1 PAPER SUPPLY SENSOR 897635
CABLE ASSY. 897912
J140 J1 PAPER MOTION SENSOR CL-810290
CABLE ASSY. CL-610338

J1 J3 J4 J2 PEN HEAT CONTROL CHANNELS 1 & 2 897809
P1 J108
J117

(OPTIONAL)
J2 J1 INTERCHANNEL ANNOTATION DRIVES 1 & 2 CL-810191
P1 J104
J109
J120

J130 J201 KEYBOARD / DISPLAY 897843-1
CABLE ASSY. CL-710329

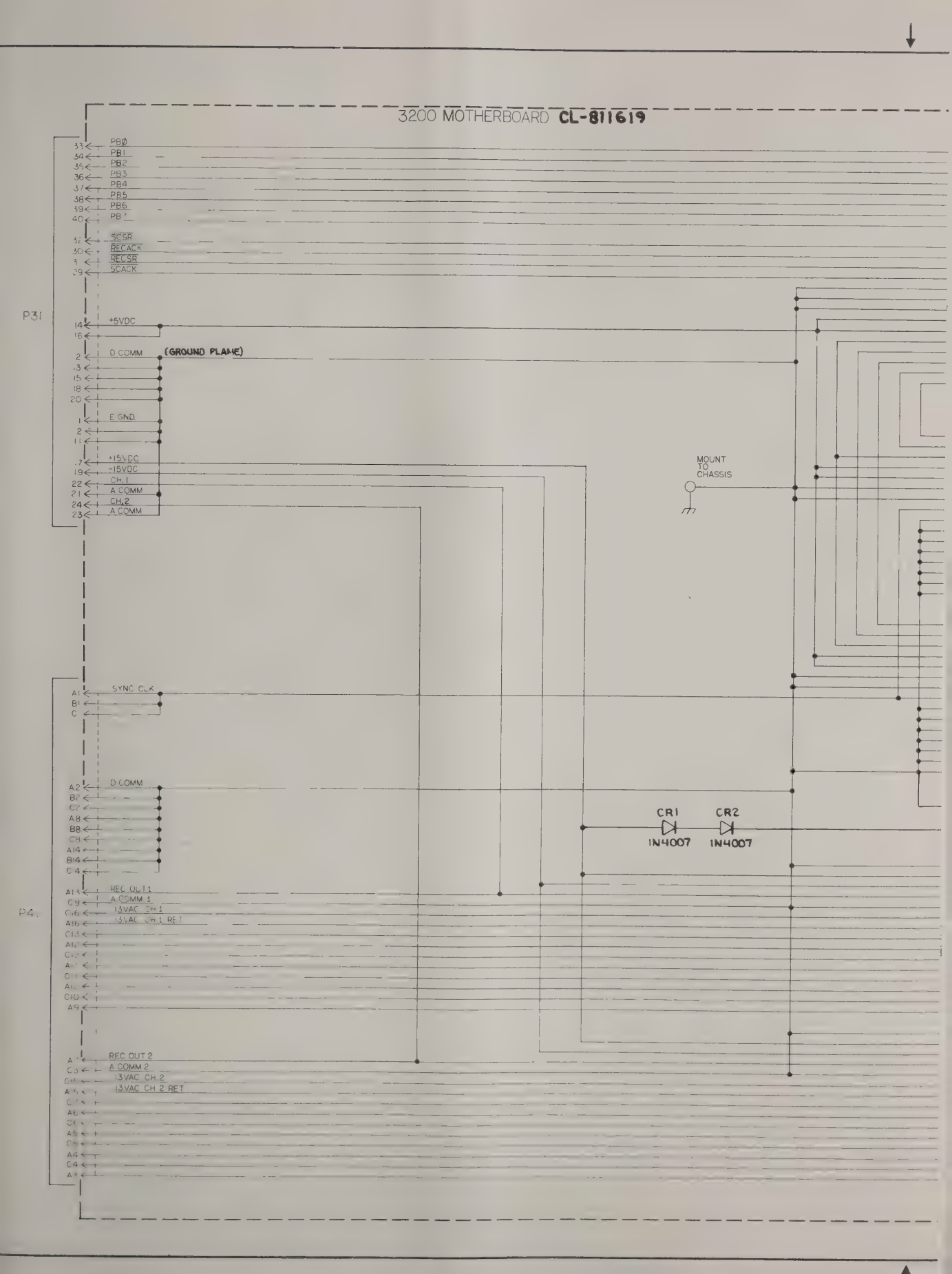
MODEL NO. 30-V8202-00

BY	DATE	NAME
DR KOCHIS	3-5	SCHEMATIC, OVERALL
CH Smith	4/87	
APP	4/87	

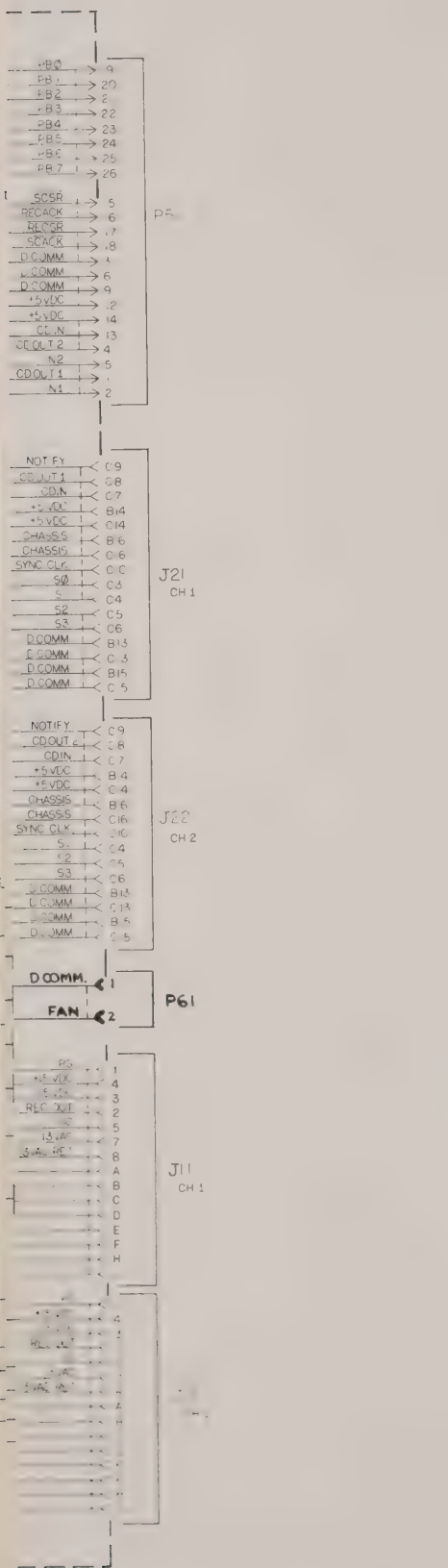
CODE IDENT 96795 ISSUE CODE G

Gould Inc
Instruments Division
[illegible] 44114 U.S.A.

DWG NO CL-211540


3200 MOTHERBOARD CL-811619
P31
P4
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
SCSR
RECACK
RECSR
SCACK
+5VDC
D COMM
(GROUND PLANE)
E GND
+15VDC
-15VDC
CH 1
A COMM
CH 2
A COMM
MOUNT TO CHASSIS
SYNC CLK
D COMM
CR1
CR2
1N4007
1N4007
REC OUT 1
A COMM 1
13VAC CH 1
13VAC CH 1 RET
REC OUT 2
A COMM 2
13VAC CH 2
13VAC CH 2 RET

REVISIONS		
SYM	DESCRIPTION	DATE
A-1	ORIG. REL. ISSUE LEVEL/A.J.S.	4-27-87
B-1	REVISED PER DCN 34380/A.J.S.	9-25-87



BOARD ASS'Y., 3200 MOTHER CL-811619

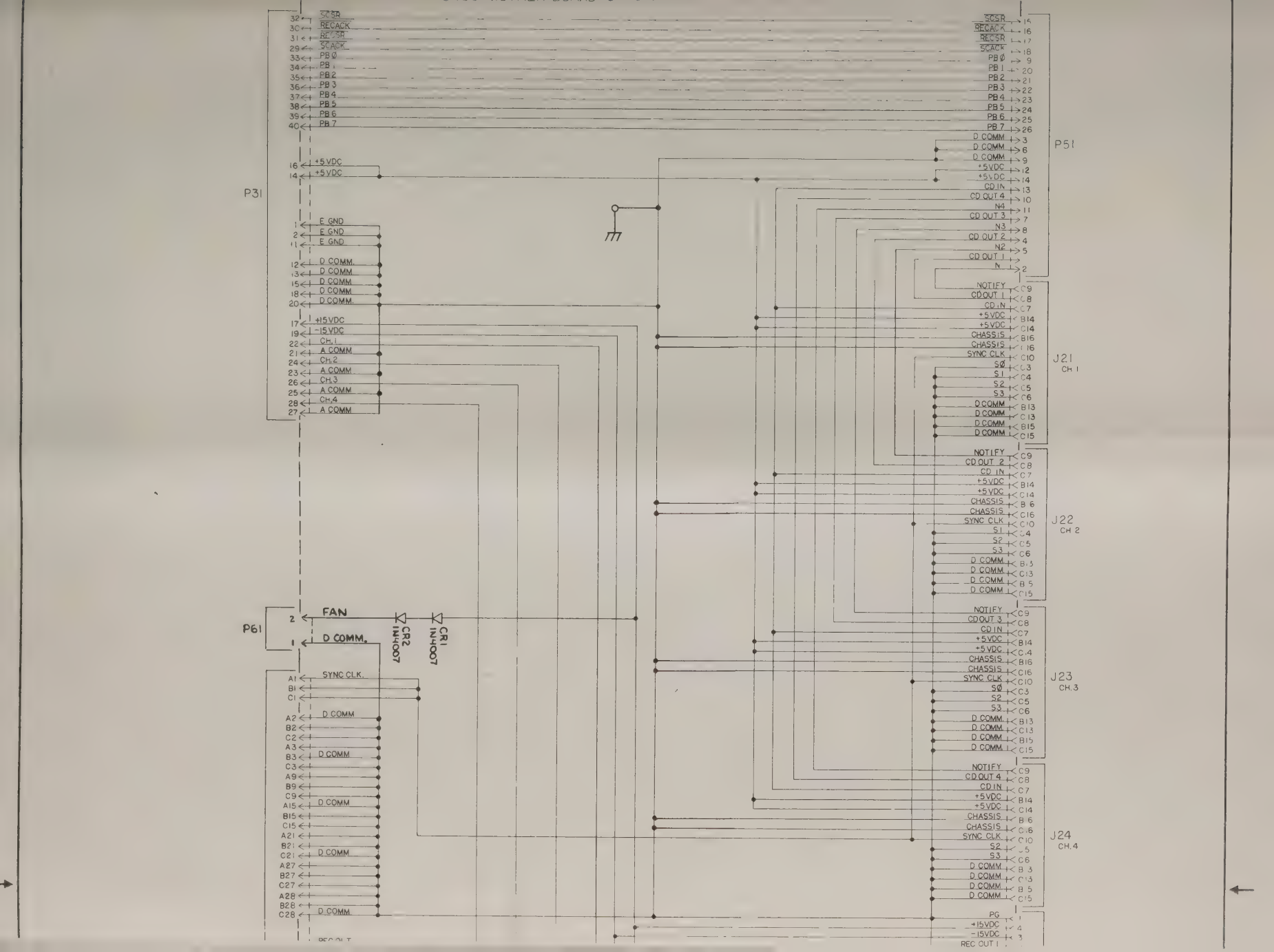
BY	DATE
DR A. SOTEROS	4-27-87
CH KISNER	4-27-87
APP	

NAME: SCHEMATIC

CODE IDENT: 96795 ISSUE CODE: G

Gould Inc.
Instruments Division
Cleveland Ohio 44114 U.S.A.

DWG NO: CL-211619


P31
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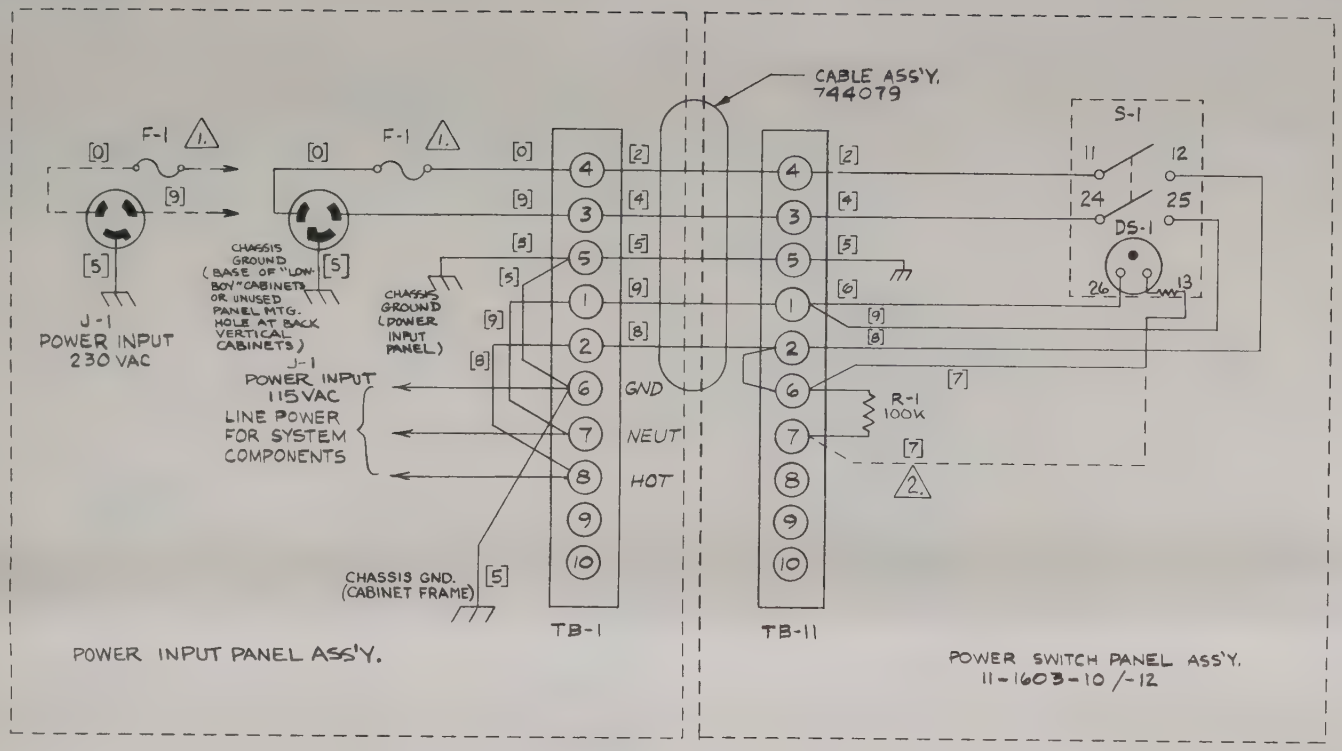
REVISIONS		
SYM	DESCRIPTION	DATE
A-1	ORIG. REL. ISSUE LEVEL/A.J.S.	9-27-87
B-1	REVISED PER DCN 34381 / A.J.S.	9-24-97

BOARD ASS'Y., 3400 MOTHER CL-811640

BY	DATE	NAME	Gould Inc Instruments Division
DR A. SOTEROS	9-27-87	SCHEMATIC	Cleveland, Ohio 44114 U.S.A.
CHK SNER	9-27-87	CODE IDENT 96795	SIZE G
APP			DWG NO CL-211640

CL-211640

J-1	REV'D PER DCN 32445	RIVERA	11-22-85



3. [ ] = EIA COLOR CODE.

2. FOR 230V OPERATION MOVE WIRE [7] FROM TERMINAL 6 TO TERMINAL 7 OF TB-11.

1. FUSE RATING: 884208-1 & -5 (115 VAC) - 10A
884208-6 (230 VAC) - 5A

NOTES:

REQD	ITEM	PART NUMBER	DESCRIPTION	REMARKS	CML
			LIST OF MATERIAL		

S-2030 FIRST USE

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING
.XXX = ± .006 SURFACE
.XX = ± .015 FINISH
.X = ± .06 ANGLES = ± 0° 30'
SEE WORKMANSHIP STD-TITLED "MFG. TOLERANCES & STD'S," WHEN DESIRED INTENT IS NOT CLEARLY DEFINED ON DRAWING.

	BY	DATE
DR.	FOWLER	5-25-73
CH.		
APP.	KLOSS	9-17-73

MATL. NONE
ADD. FIN. NONE
ISSUE G
CODE
SCALE NONE

NAME: DIA., WIRING - POWER KIT

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.

DWG. NO. 384919
FED. CODE NO. 96795

Form S.19 1-79

384919

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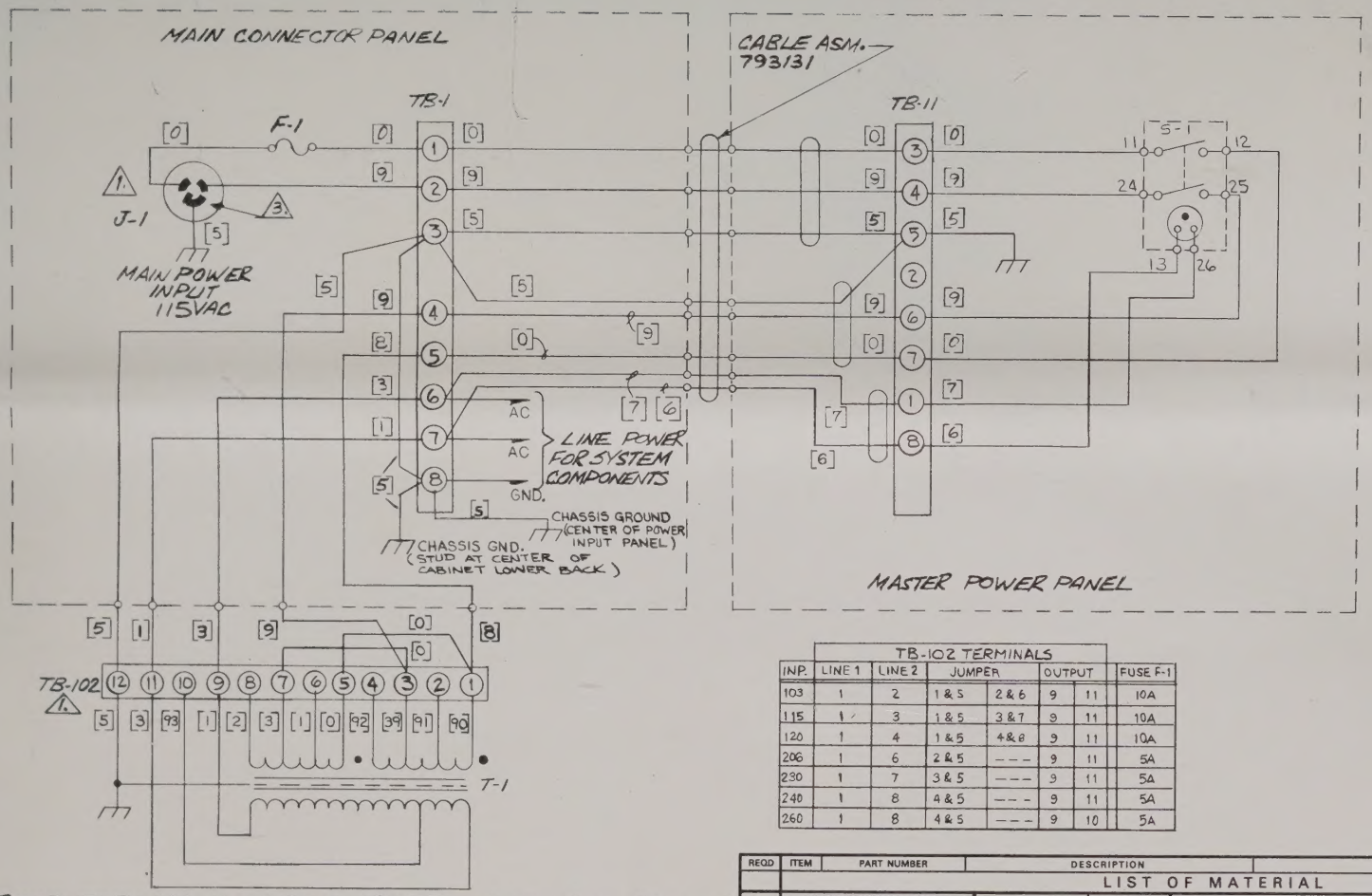
H-1	REV'D TB-1 PER DCN 32541	RIVERA	12-11-85



	TB-102 TERMINALS					
INP.	LINE 1	LINE 2	JUMPER	OUTPUT		FUSE F-1
103	1	2	1 & 5	2 & 6	9	11	10A
115	1	3	1 & 5	3 & 7	9	11	10A
120	1	4	1 & 5	4 & 8	9	11	10A
206	1	6	2 & 5	- - -	9	11	5A
230	1	7	3 & 5	- - -	9	11	5A
240	1	8	4 & 5	- - -	9	11	5A
260	1	8	4 & 5	- - -	9	10	5A

3. GROUND TERMINAL MUST BE CONNECTED DIRECTLY TO BASE OF "LOWBOY" CABINETS OR TO UNUSED PANEL MOUNTING HOLE OF VERTICAL CABINETS.
2. [ ] = E.I.A. COLOR CODE.
1. TRANSFORMER SHOWN FOR 115VAC POWER INPUT.

NOTES:

REQD	ITEM	PART NUMBER	DESCRIPTION	REMARKS	CML

LIST OF MATERIAL

893136 FIRST USE	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND INCLUDE PLATING; .XXX = ± .005 SURFACE FINISH; .XX = ± .015; .X = ± .06; ANGLES = ± 0° 30'	BY / DATE: DR D BAILEY 5-1-79; CH Tyrrell 6-8-79; APP Tyrrell 6-8-79	NAME: WIRING DIAGRAM POWER KIT	Gould Inc. Instrument Systems Division Cleveland, Ohio 44114 U.S.A.	
	MARK: PER WORKMANSHIP STD. TITLED "MFG. TOLERANCES & STD'S." WHEN DESIRED INTENT IS NOT CLEARLY DEFINED ON DRAWING.	ADD. FIN.: NONE	FED. CODE NO.: 96795	ISSUE CODE: G	DWG. NO.: 393130
			SCALE: NONE		

393130

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